

Wild and Scenic River, Section 7 Analysis and Determination

Wild and Scenic River

Section 7 Analysis and Determination

Introduction

Federal protection of this section of the Trinity River in the Wild and Scenic System was completed in order to preserve the Outstandingly Remarkable Values (ORV) identified on the date of designation (January 19, 1981). These ORV's include the free-flowing condition, anadromous and resident fisheries, outstanding geologic resource values, scenic values, recreational values, cultural and historic values, and the values associated with water quality. As part of a cooperative agreement, the Bureau of Land Management (BLM) and the Shasta-Trinity National Forest (STNF) classified the Trinity River mainstem as a Recreational River from 100 yards below Lewiston Dam downstream to Cedar Flat (a distance of approximately 97.5 miles).

This analysis and subsequent determination evaluates the effects of the Lewiston–Dark Gulch Rehabilitation Project: Trinity River Mile 105.4 to 111.7 (proposed project) on the Trinity River's free-flowing attributes and other ORV's, and ensures their protection as required under Section 7 of the Wild and Scenic Rivers Act (WSA). Due to the level of detail provided in the Environmental Assessment/Draft Environmental Impact Report (EA/Draft EIR), this analysis is presented in a summary format and refers the reader to the specific sections of chapters 2, 3 and 4 of the EA/Draft EIR for additional information on water quality, fisheries, wildlife, flora and fauna, recreational, cultural resources and aesthetic values.

Section 7 Analysis

This analysis and determination follows the Evaluation Procedure presented in Appendix C of the *Technical Report of the Interagency Wild and Scenic Rivers Coordinating Council, Wild and Scenic Rivers Act: Section 7*. Under interagency agreement between the National Park Service, the BLM, and the U.S. Forest Service, the BLM generally has responsibility for conducting Section 7 determinations for the WSA-designated river segment.

1) Establish Need

a. The specific purpose of the proposed project is to protect or enhance the values for which the river was designated as eligible; restore the natural characteristics of the river; and/or improve the water quality of the river. The proposed project would initiate channel rehabilitation activities as described in Chapter 2 of the EA/Draft EIR. The proposed project was included in the Record of Decision (ROD) issued by the Department of the Interior (DOI) in 2000 and is intended to restore the fish resources of the Trinity River. This project would be implemented in conjunction with other programs and projects under the direction of the Trinity River Restoration Program (TRRP). Implementation of the Proposed Action would include measures to assure that the project is consistent with the goals established under the BLM's *Redding Resource Management Plan*, and the STNF Land and Resource Management Plan (LRMP) specifically to support management actions that would enhance Trinity River fisheries. The Proposed Action would not diminish the scenic, recreational, or water quality values associated with the river.

b. Project-related impacts to free-flowing characteristics of the river would be minimized to the extent practicable.

c. The project proponent and manager is the Trinity River Restoration Program (TRRP). The TRRP is an administrative office of the Mid-Pacific Region of the Bureau of Reclamation (Reclamation) responsible for implementing the 2000 Record of Decision intended to restore the fishery resources of the Trinity River. The Proposed Action has been developed through a cooperative effort by the Bureau of Reclamation (Reclamation), BLM, the STNF, and the Trinity County Resource Conservation District (TCRCD) under the direction of the TRRP. The Proposed Action would improve the conveyance of flows by reestablishing alluvial attributes of the Trinity River, namely floodplains, side channels, and transverse bars. These activities are intended to decrease the potential for channel constriction by removing riparian berms.

The Proposed Action is consistent with management goals and objectives for the Trinity River and is designed to maintain and/or enhance the ORV's. It is also consistent with BLM and STNF objectives that support the TRRP.

2) Define a Proposed Activity

The project proponent the project purpose and need, and the geographic location of the project are described in Chapter 1 of the EA/Draft EIR. Specific information on the duration of construction of the Proposed Action and the magnitude/extent of the proposed activities is provided in Chapter 2 of the EA/Draft EIR. Chapter 4 describes the relationship to

past and future management activities with an emphasis on cumulative effects.

3) Describe How the Proposed Activities Would Directly Alter Within-Channel Conditions

Implementation of the Proposed Action would result in both short-term and long-term impacts. These impacts and relevant mitigation measures are described in Section 3.3 (Geology), Section 3.4 (Water Resources), Section 3.5 (Water Quality), and Section 3.6 (Fishery Resources) of the EA/DEIR.

The existing conditions of the rehabilitation sites are the result of a variety of natural and management disturbance mechanisms that have occurred along the river corridor over the past 75 years. Channelization of the Trinity River is a result of historic dredge activities and has been further exacerbated by the modified flows produced by the Trinity River Division of the Central Valley Project. At the time the Trinity River was designated under the WSA, alluvial features had been modified for more than 20 years within the site boundaries and scientists recognized that the alluvial nature of the river had been modified extensively. Although recent changes in the flow regime provide some opportunity to modify the form and function of the Trinity River, the ROD (Department of Interior 2000) recognized that mechanical channel rehabilitation would be needed to reconfigure sections of the river and provide opportunities for alluvial processes to occur.

Although short-term impacts are anticipated during project implementation, primarily with regards to water quality, juvenile salmonid rearing habitat, and riparian vegetation, the long-term effects are expected to be positive and cumulatively beneficial over time.

4) Describe How the Proposed Activity Would Directly Alter Riparian and/or Floodplain Condition

The Proposed Action is anticipated to impact alluvial deposits adjacent to the Trinity River within the 6.3-mile reach encompassed by the rehabilitation site. Although it's generally recognized that these alluvial deposits existed at the time of designation, the adjustable nature of riverine environments precludes a quantification of these features. The extensive body of scientific evidence available for the Trinity River suggests that the alluvial features (e.g., riparian berms and floodplains) supported extensive, well-established riparian, although somewhat homogenous communities at the time of designation. As a result of modified flow regimes, these alluvial deposits came to be inhabited by a monoculture of riparian vegetation. The interaction between vegetation and fine sediment continued to exacerbate this condition along the river

corridor although large floods, such as that which occurred in 1997, modified this riparian community to some degree. To varying degrees, riparian berms tend to inhibit access to the floodplain, particularly at the Dark Gulch site.

Section 3.4 (Water Resources), Section 3.6 (Fishery Resources), and Section 3.7 (Vegetation, Wildlife and Wetlands) discuss the specific impacts and relevant mitigation measures associated with the Proposed Action relative to existing riparian and floodplain conditions. Although short-term impacts are anticipated during construction, the long-term effects are expected to be positive and cumulatively beneficial over time. As a component of the TRRP, the Proposed Action is expected to benefit the Trinity River's ORV's, including anadromous fish resources.

5) Describe How the Proposed Activity Would Directly Alter Upland Conditions

The Proposed Action would remove alluvial material from the channel bed, banks and floodplains. This material would be placed either on adjacent upland areas or processed on site for future use in the coarse gravel augmentation program. A riparian revegetation plan will be incorporated into the Proposed Action and will emphasize the reestablishment of native species and vegetative community types throughout the entire project boundary. Respective sections of the EA/Draft EIR, Chapter 3 (i.e., Section 3.4 (Water Resources), Section 3.6 (Fishery Resources), Section 3.7 (Vegetation, Wildlife and Wetlands), Section 3.8 (Recreation), Section 3.11 (Cultural Resources) and Section 3.14 (Aesthetics)) discuss the specific impacts and relevant mitigation measures relative to upland conditions as they relate to the ORV's for the Trinity River.

6) Evaluate and Describe How Changes in On-Site Conditions Can/Would Alter Existing Hydrologic or Biologic Processes

As discussed in previous sections, the EA/Draft EIR provides a detailed description of the existing condition and environmental impacts associated with the Proposed Action, including a substantial number of mitigation measures. A primary objective of the Proposed Action is to reestablish alluvial processes within the rehabilitation site and provide the opportunity for the river to return to the floodplain with greater frequency. A basic premise of the TRRP is to promote changes to the alluvial reaches of the river in a manner that restores the physical processes and biological resources that were recognized as ORV's at the time of designation.

7) Estimate the Magnitude and Spatial Extent of Potential Off-Site Changes

Chapter 4 of the EA/Draft EIR discusses the other impacts of the Proposed Action including cumulative impacts that might result from project actions extending along the river corridor. With the exception of short-term water quality impacts (construction related turbidity), implementation of the Proposed Action would not adversely impact the Trinity River. In fact, the intent of the Proposed Action is to promote large-scale beneficial changes to the riverine environment and adjacent physical habitat. Such changes are expected to enhance efforts to restore the Trinity River's fishery resources.

8) Define the Time Scale over Which Steps 3-7 are Likely to Occur

Project implementation is anticipated to occur between fall 2006 and fall 2008. Specific limitations on project operations may be incorporated into the project as a result of applicable legal requirements.

9) Compare Project Analyses to Management Goals

Management goals relative to free-flow, water quality, riparian area, and floodplain conditions would not be affected by the Proposed Action. It is expected that one of the primary benefits of this project would be to increase the ORV (specifically, anadromous fisheries) of the Trinity River. Impacts to the visual resources of the Trinity River would be minimal with the implementation of design criteria and mitigation measures. The Proposed Action would be consistent with any future actions taken by the TRRP.

10) Section 7 Determination

Implementation of the Proposed Action, as described in Chapter 2 of the EA/Draft EIR, would not affect the free-flowing condition of this segment of the Trinity River.

**Federally Listed/Proposed Threatened
and Endangered Species for Trinity County**

Listed/Proposed Threatened and Endangered Species for Trinity County (Candidates Included)

July 16, 2007

Document number: 513842394-142843

KEY:

(PE) Proposed Endangered Proposed in the Federal Register as being in danger of extinction

(PT) Proposed Threatened Proposed as likely to become endangered within the foreseeable future

(E) Endangered Listed in the Federal Register as being in danger of extinction

(T) Threatened Listed as likely to become endangered within the foreseeable future

(C) Candidate Candidate which may become a proposed species Habitat Y = Designated, P = Proposed, N = None Designated

* Denotes a species Listed by the National Marine Fisheries Service

Type	Scientific Name	Common Name	Category	Critical Habitat
Plants				
	<i>Arabis macdonaldiana</i>	McDonald's rock-cress	E	N
Fish				
	<i>Hypomesus transpacificus</i>	delta smelt	T	Y
*	<i>Oncorhynchus kisutch</i>	S. OR/N. CA coho salmon	T	Y
*	<i>Oncorhynchus mykiss</i>	Central Valley steelhead	T	Y
*	<i>Oncorhynchus mykiss</i>	Northern California steelhead	T	Y
*	<i>Oncorhynchus tshawytscha</i>	CA coastal chinook salmon	T	Y
*	<i>Oncorhynchus tshawytscha</i>	Central Valley fall/late-fall chinook salmon	C	N
*	<i>Oncorhynchus tshawytscha</i>	Central Valley spring-run chinook salmon	T	Y
*	<i>Oncorhynchus tshawytscha</i>	winter-run chinook salmon	E	Y
Amphibians				
	<i>Rana aurora draytonii</i>	California red-legged frog	T	Y
Birds				
	<i>Brachyramphus marmoratus</i>	marbled murrelet	T	P
	<i>Coccyzus americanus</i>	Western yellow-billed cuckoo	C	N
	<i>Haliaeetus leucocephalus</i>	bald eagle	T	N
	<i>Strix occidentalis caurina</i>	northern spotted owl	T	Y
Mammals				
	<i>Martes pennanti pacifica</i>	Pacific fisher	C	N

Listed/Proposed Threatened and Endangered Species for the LEWISTON Quad (Candidates Included)

July 16, 2007

Document number: 513842394-142945

KEY:

(PE) Proposed Endangered Proposed in the Federal Register as being in danger of extinction

(PT) Proposed Threatened Proposed as likely to become endangered within the foreseeable future

(E) Endangered Listed in the Federal Register as being in danger of extinction

(T) Threatened Listed as likely to become endangered within the foreseeable future

(C) Candidate Candidate which may become a proposed species Habitat Y = Designated, P = Proposed, N = None Designated

* Denotes a species Listed by the National Marine Fisheries Service

Type	Scientific Name	Common Name	Category	Critical Habitat
Fish				
	<i>Hypomesus transpacificus</i>	delta smelt	T	Y
*	<i>Oncorhynchus kisutch</i>	S. OR/N. CA coho salmon	T	Y
*	<i>Oncorhynchus tshawytscha</i>	winter-run chinook salmon	E	Y
Birds				
	<i>Coccyzus americanus</i>	Western yellow-billed cuckoo	C	N
	<i>Haliaeetus leucocephalus</i>	bald eagle	T	N
	<i>Strix occidentalis caurina</i>	northern spotted owl	T	Y
Mammals				
	<i>Martes pennanti pacifica</i>	Pacific fisher	C	N

**Programmatic Agreement Among the
U.S. Bureau of Reclamation, U.S. Fish and Wildlife
Service, U.S. Bureau of Land Management,
Hoopa Valley Tribe, California State Historic
Preservation Officer, and The Advisory
Council on Historic Preservation Regarding
Implementation of the Trinity River
Mainstem Fishery Restoration
and Section 106 Consultation**

PROGRAMMATIC AGREEMENT
AMONG THE U. S. BUREAU OF RECLAMATION,
U. S. FISH AND WILDLIFE SERVICE, U.S. BUREAU OF LAND MANAGEMENT,
HOOPA VALLEY TRIBE,
CALIFORNIA STATE HISTORIC PRESERVATION OFFICER, AND
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING IMPLEMENTATION OF
THE TRINITY RIVER MAINSTEM FISHERY RESTORATION

WHEREAS, the U.S. Bureau of Reclamation (Reclamation), U. S. Fish and Wildlife Service (Service), U.S. Bureau of Land Management (Bureau), and the Hoopa Valley Tribe (Tribe) have determined that implementing the actions (Undertaking) outlined in the Trinity River Mainstem Fishery Restoration Environmental Impact Statement/Report (Trinity EIS/R) for purposes of protecting, restoring, and enhancing fish and wildlife, may affect historic properties; and

WHEREAS, Reclamation, the Service, the Bureau (agencies) and the Tribe have elected to comply with Section 106 of the National Historic Preservation Act (NHPA) for the Undertaking through execution and implementation of a Programmatic Agreement (Agreement) pursuant to 36 CFR Section 800.14, because not all Trinity EIS/R implementing actions have as yet been identified and because neither the scope and magnitude of the Undertaking's effects to historic properties nor the historic properties themselves have been identified at the time of execution of this Agreement; and

WHEREAS, the agencies, pursuant to 36 CFR 800.8(a)(1) and 800.8(a)(3), will coordinate compliance with the requirements of the National Environmental Policy Act (NEPA) for actions covered by this Agreement with the requirements of Subpart B of 36 CFR Part 800, and as part of this process of coordination, may use the NEPA process and associated documentation to supplement compliance with Subpart B; and

WHEREAS, pursuant to 36 CFR Section 800.2(c)(2)(ii), the Tribe's representative shall be included in the term Tribal Historic Preservation Officer (THPO) for undertakings occurring on or affecting historic properties on its tribal lands and affecting properties of religious and cultural significance to the Tribe located on or off-tribal lands, and for any such undertakings, the primary responsible Federal agency (RFA) shall also consult with the THPO, in addition to the SHPO, where consultation is required under this Agreement; and

WHEREAS, the agencies have consulted with the California State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (Council) pursuant to Section 800.14 (b) of the regulations (36 CFR Part 800) implementing Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. 470f) to resolve any adverse effects of the Undertaking on historic properties; and

WHEREAS, throughout the implementation of this Agreement, Reclamation and the Service shall consult with Indian tribes, organizations and individuals that may attach religious and cultural significance to, or that may have concerns about the Undertaking's effects on historic properties,

NOW, THEREFORE, Reclamation, the Service, the Bureau, the Tribe, the SHPO, and the Council agree that the following stipulations shall be implemented in order to take into account the effects of the Undertaking on historic properties, and that these stipulations shall govern the Undertaking and all of its parts until this Agreement expires or is terminated.

STIPULATIONS

Reclamation and the Service shall ensure that the following measures are carried out:

I. ASSIGNMENT OF RESPONSIBILITY

Either Reclamation or the Service will be responsible for ensuring that the terms of this Agreement are carried out for all individual actions authorized or funded by the Department of the Interior comprising the Undertaking, irrespective of where or by whom the action will be carried out. Prior to preparation of environmental documentation for each action covered by this Agreement, Reclamation and the Service will consult to determine which agency will serve as primary responsible federal agency (RFA) for such action. The selected RFA will be responsible for implementing the terms of this Agreement with respect to the action proposed. The Service shall comply with the terms of this Agreement for the Undertaking and all individual actions therein, in lieu of the Programmatic Agreement among the Service, Council, and the SHPO executed on May 7, 1997.

II. AREAS OF POTENTIAL EFFECTS (APEs)

a. For purposes of this Agreement, the APE for the Undertaking in its entirety shall consist of the area within the 500 year floodplain of the Trinity River from the Trinity Reservoir downstream to the Hoopa Valley Indian Reservation, the area within the drawdown zones of the Trinity Reservoir, and ancillary areas within or outside of the 500 year floodplain that will be affected by implementing actions and associated facilities, such as material borrow sites, access roads, sediment pond construction and maintenance.

b. At the earliest stage of planning for any action comprising the Undertaking, the RFA will determine and document an area of potential effects (APE) in strict accordance with the definition set forth in 36 CFR 800.16(d). The APE for an action covered by this Agreement will be defined either before or concurrently with the earliest stages of NEPA compliance for the action.

III. REVIEW OF TRINITY EIS/R IMPLEMENTING ACTIONS

a. Coordination with NEPA

The RFA shall ensure that compliance with the terms of this Agreement is coordinated with NEPA compliance. When a specific Trinity EIS/R implementing action is identified, the RFA's archaeologist will establish an APE pursuant to Stipulation III.B., below, and ensure that an appropriate level of effort is conducted to identify historic properties within that APE. Specific steps taken to comply with this Agreement will be included in an Environmental Assessment (EA) or categorical exclusion checklist (CEC) prepared for a Trinity EIS/R implementing action. An EA will, to the extent possible,

describe efforts to identify historic properties and, if applicable, identify and discuss measures that will avoid, minimize or mitigate potential adverse effects to historic properties. CECs will be prepared for minor actions where no historic properties have been identified within the APE. All CECs will be reviewed by Reclamation's Regional Archeologist, or by the Bureau's Redding or Arcata Field Archeologist, or by the Service's Regional Archeologist, to ensure that no historic properties will be affected by a proposed action. The final EIS or subsequent NEPA documentation for a Trinity EIS/R implementing action shall include, to the extent possible, appropriate documentation evidencing compliance with the terms of this Agreement. The RFA will ensure that the Finding of No Significant Impact or the Record of Decision for any action includes a plan for the treatment of historic properties adversely affected by such action.

b. IDENTIFYING HISTORIC PROPERTIES

36 CFR 800.4(b)(1) is the general standard which the RFA will use to determine the level of effort needed to identify historic properties within the APE of each Trinity EIS/R implementing action covered by this Agreement. In addition, as part of identification, the RFA will place special emphasis on the consultation prescribed by 36 CFR 800.4(a)(4) and by 36 CFR 800.4(b). The general standard set forth in 36 CFR 800.4(b)(1) will be supplemented by the following:

(1) The results of the cultural resources overview prepared for the Trinity River Mainstem Fishery Restoration EIS/R;

(2) Applicable inventory standards identified in Reclamation Instructions (376.3B) or in the Service's Administrative Manual and the Service's Cultural Resource Management Handbook (1985). Cultural resources and historic properties identified during inventory will be recorded as follows:

(a) A new or updated California Department of Parks and Recreation Form DPR 523 (series 1/95) will be completed in accordance with the Instructions for Recording Historical Resources (Office of Historic Preservation, March 1995). The RFA will ensure that forms are submitted to the appropriate Information Center of the California Historical Resources Information System (CHRIS) for assignment of permanent site numbers. These site numbers will be used to the extent possible as inventory reports are prepared.

(b) National Register Bulletin 38 will be the standard used by the RFA to identify and document traditional cultural properties, based on consultation with the Tribe and other tribes, organizations, or individuals who may attach religious and cultural significance to historic properties that may be affected by the Undertaking. Traditional cultural properties identified during inventory may be recorded on the DPR 523 unless the Tribe or another Indian tribe, organization or individual objects. If such objection arises, the properties may be recorded on a form and in a manner that is in accordance with the recommendations of the Tribe or other Indian tribes, organizations or individuals, subject to the confidentiality requirements set forth in Stipulation VI.C., below. If traditional cultural properties affiliated with

other parties are identified during inventory, these parties will be consulted by the RFA in accordance with 36 CFR 800.2(c)(6).

(c) The applicable cultural resource data base including information available from the appropriate Information Center of the California Historical Resources Information System (CHRIS), and professional staff estimation; and

(d) The National Park Service publication, "The Archeological Survey: Methods and Uses" (King 1978);

c. EVALUATING PROPERTIES AND DETERMINING EFFECTS

(1) A Trinity EIS/R implementing action will be exempt from further consideration under this Agreement if any of the following conditions are met:

(a) The RFA's archaeologist determines that there are no cultural resources in the APE, based on the results of identification efforts outlined in Stipulation III.B. above; or

(b) The RFA's archaeologist determines that no cultural resources will be affected, based on the results of identification efforts outlined in Stipulation III.B. and C.; or

(c) The RFA's archaeologist determines that cultural resources may be affected, but based on the evaluation prescribed in paragraph C.2. of this stipulation, such resources are determined ineligible for inclusion in the National Register of Historic Places (NRHP).

(2) If the RFA's archaeologist determines that an action covered by this Agreement may affect a cultural resource, the RFA's archaeologist will evaluate the cultural resource in accordance with the process set forth in 36 CFR 800.4(c)(1) before any activity that may affect the resource is initiated. If the resource in question may be a traditional cultural property, the RFA will use National Register Bulletin 38 in conducting the evaluation.

(3) If the RFA determines pursuant to paragraph C.2. of this stipulation, that the cultural resources subject to effects are eligible for inclusion in the NRHP, the RFA's archaeologist will follow 36 CFR 800.5 to determine whether such effects may be adverse.

(a) If this consultation results in a finding of no adverse effect to historic properties, the RFA's archaeologist will conclude the consultation by complying with 36 CFR 800.5(d).

(b) If this consultation results in a finding that historic properties will be adversely affected, the RFA's archaeologist will ensure that the adverse effects are taken into account in accordance with paragraph D. of this stipulation.

d. HISTORIC PROPERTY TREATMENT PLANS (HPTs)

(1) The RFA's archaeologist will develop HPTPs to resolve the adverse effects on historic properties of actions covered by this Agreement. Separate HPTPs may be prepared for individual Trinity EIS/R implementation actions. HPTPs will be developed by the RFA in consultation with the SHPO, the Tribe, other Indian tribes, organizations and individuals, and the Council if it so requests, and with any interested parties identified by the signatory parties to this Agreement. HPTPs will be submitted for review according to the procedures set forth in paragraph D.4. of this stipulation.

(2) HPTPs will be consistent with the ~~A~~Archaeology and Historic Preservation: Secretary of Interior's Standards and Guidelines (FR 44716-44742), including the "Secretary of the Interior's Standards and Guidelines for Archaeological Documentation" (48 FR 44734-37)" and the Council's "Recommended Approach for Consultation on Recovery of Significant Information from Archeological Sites" (64 FR 27085-87). HPTPs shall at a minimum:

Describe the historic property or portion of the property where treatment will be implemented. The HPTP shall contain a description of the values that make the property eligible for the National Register of Historic Places, and describe the measures proposed to protect each historic property. These measures may include, but not necessarily be limited to avoidance, monitoring, capping, fencing, land use policy and planning techniques such as zoning restrictions, protective covenants, etc. The preservation of historic properties is the preferred alternative, wherever feasible; if data recovery is proposed, the HPTP also shall:

(a) Specify the research questions to be addressed through recovery of data;

(b) Explain why it is in the public interest to address these research questions, including a description of any efforts to interpret the result of the investigations for the public;

(c) Explain how the historic properties subject to data recovery can address these research questions;

(d) Specify the methods to be used in field work and analysis, and explain how these methods are relevant to the research questions;

(e) Indicate how recovered material and records will be disposed of, taking into account the expressed wishes of the Tribe, of other Indian tribes, organizations, or individuals and, as applicable, of interested parties;

(f) Provide a schedule for completing data recovery, including analysis, reporting and disposition of materials and records;

(g) Include a schedule for providing the Tribe, other Indian tribes, organizations and individuals, SHPO and, as applicable, interested parties, with the opportunity to review and comment on reports documenting implementation of HPTPs.

(h) Include a schedule for completing final data recovery reports and specify when and to whom this report will be distributed;

(i) Provide for development and implementation of a Plan of Action in accordance with 43 CFR 10 for the management of Native American cultural items that will be repatriated to the Tribe or to other Indian tribes pursuant to the Native American Graves Protection and Repatriation Act (NAGPRA); or, where non-federal property is involved, a plan providing for the treatment of Native American human remains and items associated with Native American burials in accordance with the requirements of Sections 5097.98 and 5097.991 of the California Public Resources Code;

(j) Specify that, following any repatriation pursuant to item I., above, the RFA will ensure that all records and all non-repatriated objects resulting from data recovery are curated in accordance with 36 CFR 79;

(k) Include a plan for the treatment of properties discovered during implementation of an action covered by this Agreement;

(l) Include a plan for monitoring construction activities that may affect historic properties; this plan shall include a monitoring schedule, provide for the participation of a professional archeologist, and, as appropriate, Tribal member(s), members of other Indian tribes, organizations, individuals and interested parties.

(3) The RFA will submit draft HPTPs to the SHPO, the Tribe, other Indian tribes, organizations and individuals, the Council if it so requests after being informed of its development, and to any interested parties identified by the signatory parties, for review and comment. These parties shall have 30 days from receipt of any draft HPTP to comment. Failure to respond within this time frame shall not preclude the RFA from finalizing the HPTP. Before it finalizes the HPTP, the RFA will provide the reviewing parties with documentation indicating whether and how any comments from the parties will be incorporated into the final HPTP. Unless the reviewing parties object to this documentation within 15 days following receipt, the RFA may finalize the HPTP as it deems appropriate, and proceed to implement the final HPTP. If the RFA proposes to change a final HPTP, it will notify the reviewing parties about the proposed changes. Reviewing parties will have 10 days from receipt of notification to comment. Failure to respond within this time frame shall not preclude the RFA from changing the final HPTP. Before it changes the final HPTP, the RFA will provide the reviewing parties with documentation indicating whether and how any comments from the parties will be incorporated into the proposed changes. Unless the parties object to this documentation within 10 days following receipt, the RFA may change the final HPTP as it deems appropriate, and proceed to implement the amended final HPTP.

IV. NATIVE AMERICAN CONSULTATION, CURATION AND TREATMENT OF CULTURAL MATERIALS AND HUMAN REMAINS OF NATIVE AMERICAN ORIGIN

a. Reclamation and the Service will ensure that Indian tribes, organizations and individuals are consulted during, and are invited to participate in, the implementation of the terms of this Agreement. Such

consultation and participation shall include the preparation of reports that document such implementation.

b. Reclamation and the Service shall ensure that all records and materials resulting from activities carried out pursuant to this Agreement are curated pursuant to 36 CFR 79 and the provisions of the NAGPRA, 43 CFR 10, as applicable.

c. Reclamation and the Service shall ensure that any Native American human remains and objects defined under NAGPRA encountered through activities carried out pursuant to this Agreement are treated with due respect, and according to the provisions of NAGPRA, its implementing regulations, 43 CFR 10, and, as appropriate, in accordance with applicable state law.

d. Reclamation and the Service will ensure that the expressed wishes of Indian tribes, organizations, and individuals are taken into account when decisions are made relating to the treatment and disposition of Native American archaeological materials and records not subject to the provisions of NAGPRA.

V. PUBLIC PARTICIPATION

Reclamation and the Service shall use the NEPA process, and any other process they deem appropriate, to solicit public comment on the actions covered by this Agreement. The RFA shall ensure that historic preservation issues are included in notices of public meetings so that these issues can be considered and addressed in a timely manner.

VI. DOWNSTREAM AND RESERVOIR DRAWDOWN IMPACTS TO HISTORIC PROPERTIES

Reclamation and the Service shall incorporate and consider effects to historic properties in its conduct of the overall adaptive management program for the Trinity River, should such program be carried out.

Within 1 year of the execution of this Agreement, Reclamation and the Service shall ensure that a cultural resources management plan is developed addressing the identification, evaluation, and assessment of effects to historic properties within the APE downstream of and within the drawdown zone of Trinity Dam that may be affected by inundation, erosion, vandalism, and other indirect effects of the Undertaking. A draft version of the Plan shall be provided to the signatories to this Agreement for a 30-day review, revised to address the comments received, and then implemented. The Plan, developed in consultation with the SHPO, the Tribe, the agencies, and other tribes, organizations, and individuals who may attach religious and cultural significance to historic properties within this specified area, shall discuss:

a. How historic properties will be identified and evaluated for their National Register of Historic Places eligibility;

b. How changes to the integrity and physical condition of historic properties attributable to erosion, inundation, vandalism, and other effects of the Undertaking will be identified and treated; and

- c. A schedule for carrying out items 1 and 2, above.

VII. ADMINISTRATIVE STIPULATIONS

a. PROFESSIONAL STANDARDS

(1) All work required by this Agreement that addresses the identification, evaluation, treatment and documentation of historic or potentially historic properties shall be carried out by or under the direct supervision of a person or persons meeting at a minimum the Secretary of Interior's Professional Qualifications Standards (48 FR 44738-39) (PQS) in the appropriate disciplines. However, nothing in this stipulation may be interpreted to preclude Reclamation and/or Service or any agent or contractor thereof from using the properly supervised services of persons who do not meet the PQS.

(2) All documentation required by this Agreement that addresses the identification, evaluation, and treatment of historic or potentially historic properties shall be responsive to contemporary professional standards, to the Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716-40), National Park Service Bulletin 38, as well as to standards and guidelines established by the SHPO.

b. REPORT DISTRIBUTION

The RFA shall ensure that copies of all technical reports prepared to satisfy the terms of this Agreement are provided upon completion to the SHPO, the Tribe, other Indian tribes, the appropriate CHRIS Information Center, and to any interested parties designated by the signatory parties to this Agreement. The content of these reports shall be subject to the confidentiality requirements set forth in paragraph C. of this stipulation.

c. CONFIDENTIALITY

(1) Reclamation and the Service shall ensure that all sensitive information, as defined in Section 9 of the Archeological Resources Protection Act (ARPA), Section 304 of the NHPA, and NAGPRA, is managed in such a way that historic properties, traditional cultural properties, sacred objects, and human remains are not compromised, to the fullest extent available under law.

(2) Signatory and concurring parties to this Agreement shall safeguard information about the nature and location of archeological, historic, and traditional cultural properties, and not reveal that information to any additional parties, pursuant to Section 304 of the NHPA and Section 9 of the ARPA, without the express written permission of Reclamation or the Service.

d. REVIEWING IMPLEMENTATION OF THE AGREEMENT

(1) No later than one year after execution of this Agreement, and by the anniversary date of such execution each year thereafter, until the signatory parties to this Agreement agree in writing that its terms have been

fulfilled, Reclamation assisted by the Service, will prepare and provide to all parties to this Agreement, and to each Indian tribe involved in any action covered by this Agreement, a written report that includes, but is not necessarily limited to the following:

(a) A narrative that indicates how many actions were undertaken and that describes and discusses how and with what results, the requirements of Stipulations III. - V., inclusive, were met for each action;

(b) An assessment of the effectiveness of this Agreement;

(c) A discussion of any problems or unexpected issues encountered during the year;

(d) Any changes that Reclamation or the Service believe should be made in implementing this Agreement.

The reviewing parties shall have 45 days from the date of receipt to provide Reclamation and the Service with comments on the annual report. Reclamation and the Service shall take all comments received into account when considering modifications to this Agreement.

(2) At the request of any signatory, Reclamation or the Service shall hold a consultation meeting to facilitate review and comment on the annual report, or to resolve questions, issues or adverse comments that have been raised by the other signatories or by a member of the public. The signatory parties shall consult to identify other parties who may be invited to attend this meeting.

e. RESOLVING OBJECTIONS

(1) Should any signatory to this Agreement, any Indian tribe, organization or individual, or member of the public object in writing to Reclamation or to the Service regarding the manner in which the terms of this Agreement are carried out, or to any documentation prepared in accordance with and subject to the terms of this Agreement, the RFA shall consult with the objecting party to address the objection. The RFA shall determine a reasonable time frame for this consultation. If resolution is reached within this time frame, the RFA may proceed with its action in accordance with the terms of the resolution. If resolution is not reached within this time frame, the RFA shall forward all documentation relevant to the objection to the Council, including the RFA's proposed response to the objection. Within 30 days after receipt of all pertinent documentation, the Council shall exercise one of the following options:

(a) Advise the RFA that the Council concurs in its proposed response to the objection, whereupon the RFA will respond to the objection accordingly. Thereafter, the RFA may proceed with its action in a manner consistent with its proposed response; or

(b) Provide the RFA with recommendations, which the RFA will take

into account in reaching a final decision regarding its response to the objection. Upon reaching its final decision, the RFA will notify the objecting party and the Council of its final decision, and may thereafter proceed with its action; or

(c) Notify the RFA that the objection will be referred for comment, pursuant to 36 CFR 800.7(a)(4), and proceed to refer the objection and comment. In this event, the RFA shall ensure that their agency heads are prepared to take the resulting comment into account in accordance with 36 CFR 800.7(c)(4) and Section 110(1) of the NHPA. Thereafter, the RFA shall notify the objecting party and the Council of its final decision regarding the objection, and may thereafter proceed with its action.

(2) Should the Council not exercise one of the foregoing options within 30 days after receipt of all pertinent documentation, the RFA may assume the Council's concurrence in its proposed response to the objection, advise the objecting party of that response and proceed with its action in a manner consistent with that response.

(3) Disputes pertaining to the NRHP eligibility of cultural resources covered by this Agreement shall be addressed through consultation among the signatories. If such consultation fails to resolve the dispute within a time frame deemed reasonable by the RFA, the dispute will be addressed by the RFA in accordance with 36 CFR ' 800.4(c)(2).

f. AMENDMENT AND TERMINATION

(1) If any signatory believes that this Agreement should be amended, that signatory may at any time propose amendments, whereupon the signatories will consult to consider the amendment pursuant to 36 CFR ' 800.6(c)(7) and 800.6(c)(8). This Agreement may be amended only upon the written concurrence of the signatory parties.

(2) Any signatory party may terminate this Agreement. Termination of this Agreement shall proceed in accordance with the applicable provisions of 36 CFR Part 800.

(3) If this Agreement is terminated and the RFAs elect to proceed with the Undertaking, the RFAs shall comply with 36 CFR ' 800.14(b)(2)(v).

g. DURATION OF THE AGREEMENT

This Agreement will remain in effect for a period of 20 years after all the signatory parties have executed it. At the end of this time period, the Agreement will become null and void, unless it is extended by written agreement of the signatory parties. Not later than 6 months prior to the expiration of the Agreement the RFAs will notify all other parties to the Agreement of its pending expiration and, if the parties choose to continue considering the Undertaking, the RFAs shall reinitiate review of the Undertaking in accordance with 36 CFR Part 800.

h. EFFECTIVE DATE

This Agreement shall take effect when it has been executed by all of the signatory parties.

EXECUTION of this Programmatic Agreement by Reclamation, the Service, the Bureau, the Tribe, the SHPO and the Council and implementation of its terms, evidence that Reclamation, the Service, the Bureau and the Tribe have afforded the Council a reasonable opportunity to comment on the implementation of the alternatives evaluated in the Trinity EIS/R and its effects on historic properties, and that Reclamation, the Service, the Bureau and the Tribe have taken into account the effects of each action comprising implementation of the Trinity River Mainstem Fishery Restoration program on historic properties.

STATE OF CALIFORNIA

Arnold Schwarzenegger Governor

NATIVE AMERICAN HERITAGE COMMISSION

915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 - Fax



February 3, 2006

RECEIVED

FEB 03 2006

TRINITY COUNTY
PLANNING DEPARTMENT

Mr. Joshua Allen
Trinity County Planning Department
P.O. Box 2819
Weaverville, CA 96093

Re: Indian Creek Rehabilitation Project

SCH# 2006012101


Dear Mr. Allen:

Thank you for the opportunity to comment on the above-referenced document. The Commission was able to perform a record search of its Sacred Lands File for the project area, which failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the Sacred Lands File does not assure the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

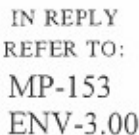
We understand consultation with Native Americans with an interest in the project area will be conducted in accordance with Section 106 of the National Historic Preservation Act. The NAHC recommends that you also request a search of archaeological records held by the California Historic Resource Inventory System at California State University, Chico.

Lack of surface evidence of archeological resources does not preclude the existence of archeological resources. Lead agencies should consider avoidance, as defined in Section 15370 of the CEQA Guidelines, when significant cultural resources are that could be affected. Provisions should also be included for accidentally discovered archeological resources during construction per California Environmental Quality Act (CEQA), Public Resources Code §15064.5 (f). Health and Safety Code §7050.5; and Public Resources Code §5097.98 mandate the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery and should be included in all environmental documents. If you have any questions, please contact me at (916) 653-6251.

Sincerely,


Carol Gaubatz
Program Analyst

Cc: State Clearinghouse



BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

MAY 16 2006

Mr. John W. Hayward,
Chairperson, Nor-Rel-Muk Nation
P.O. Box 673
Hayfork, CA 96041

Subject: Compliance with Section 106 of the National Historic Preservation Act for Habitat Restoration Projects on the Trinity River near Indian Creek, Trinity County, California

Dear Mr. Hayward:

The Bureau of Reclamation is planning to continue its Trinity River Restoration Program (Restoration Program) with a series of habitat improvement activities along Trinity River near Indian Creek at the confluence of Trinity River and Weaver Creek. The project area extends from the confluence at Douglas City, California upstream for two river miles. Activities include removing stream side vegetation, removing berms, grading feathered stream edges, materials spoiling, and creating open flood plains. The proposed project provides the opportunity to:

- Increase the diversity and area of habitat for salmonids, particularly habitat suitable for rearing;
- Increase rearing habitat for juvenile salmonids, including coho, chinook, and steelhead;
- Increase the structural and biological complexity of habitat for various species of wildlife associated with riparian habitats;
- Increase hydraulic and fluvial geomorphic diversity and complexity;
- Measure/demonstrate the ecological response to changes in flow regimes, morphological features, and aquatic, riparian, and upland habitats.

Reclamation prepared an environmental impact statement for the larger Restoration Program and developed a programmatic agreement (PA) to manage the cultural resource compliance efforts. The Hoopa Valley Tribe signed the PA. In compliance with the PA and National Historic Preservation Act (NHPA) requirements, Reclamation conducted archeological inventories in the APE. This field work revealed mining features related to placer, hydraulic, and dredger mining during the late 1800s and early 1900s. No archeological resources were discovered, due, in part, to the extensive modification experienced within the project area.

Implementing regulations for Section 106 of the National Historic Preservation Act (NHPA) (16 USC 470 *et seq.*) require that Federal agencies seek information, as appropriate, from individuals and organizations likely to have knowledge of, or concerns with, historic properties in the APE

Classification	ENC-3.00
Project	GF
Control No.	6000900
Folder No.	10774

(36 CFR 800.4(a)(3)). The Native American Heritage Commission was contacted about the project and provided your name as a possible source of information regarding potential Native American concerns in Trinity County. Reclamation, as the Federal agency approving this suite of restoration actions along the Trinity River, invites your input regarding the presence of any properties of religious and cultural significance within the APE for the areas of habitat restoration. If these historic properties are confidential, 800.11(c) allows Federal agencies to withhold this information from the public.

Please contact Amy Lawrence at 916-978-5040, or via email at alawrence@mp.usbr.gov if you have questions or comments regarding this effort to identify Native American cultural resources along this segment of the Trinity River.

Sincerely,

sgd Michael Nepstad

Michael Nepstad
Deputy Regional Environmental Officer

Enclosures

Identical Letters Sent To:

Ms. Carol Y. Bowen
1797 Shasta Street
Anderson, CA 96007

Mr. Charles Ammon
Tsnungwe Council
P.O. Box 373
Salyer, CA 95563

Mr. Robert Burns
Wintu Educational and Cultural Council
12138 Lake Blvd.
Redding, CA 96003

cc: Mr. Dean Prat
Regional Water Quality Control Board, Region 1
915 Capitol Mall, Room 364
Sacramento, CA 95814
(w/o encl)



IN REPLY
REFER TO:

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

MP-153
ENV-3.00

MAY 16 2006

OFFICIAL FILE COPY
RECEIVED

MAY 18 '06

BUREAU OF RECLAMATION
NORTHERN CA AREA OFFICE

CODE	INT.	DATE
153		

Mr. Clifford L. Marshall
Chairperson, Hoopa Valley Tribe
P.O. Box 1348
Hoopa, CA 95546

Subject: Compliance with Section 106 of the National Historic Preservation Act for Habitat Restoration Projects on the Trinity River near Indian Creek, Trinity County, California

Dear Mr. Marshall:

The Bureau of Reclamation is planning to continue its Trinity River Restoration Program (Restoration Program) with a series of habitat improvement activities along Trinity River near Indian Creek at the confluence of Trinity River and Weaver Creek. The project area extends from the confluence at Douglas City, California upstream for two river miles. Activities include removing stream side vegetation, removing berms, grading feathered stream edges, materials spoiling, and creating open flood plains. The proposed project provides the opportunity to:

- Increase the diversity and area of habitat for salmonids, particularly habitat suitable for rearing;
- Increase rearing habitat for juvenile salmonids, including coho, chinook, and steelhead;
- Increase the structural and biological complexity of habitat for various species of wildlife associated with riparian habitats;
- Increase hydraulic and fluvial geomorphic diversity and complexity;
- Measure/demonstrate the ecological response to changes in flow regimes, morphological features, and aquatic, riparian, and upland habitats.

Reclamation prepared an environmental impact statement for the larger Restoration Program and developed a programmatic agreement (PA) to manage the cultural resource compliance efforts. The Hoopa Valley Tribe signed the PA. In compliance with the PA and National Historic Preservation Act (NHPA) requirements, Reclamation conducted archeological inventories in the APE. This field work revealed mining features related to placer, hydraulic, and dredger mining during the late 1800s and early 1900s. No archeological resources were discovered, due, in part, to the extensive modification experienced within the project area.

Implementing regulations for Section 106 of the NHPA require that Federal agencies identify Indian Tribes that might attach religious and cultural significance to historic properties in the

U.W. Classification: ENU-3.00
Process: GR
Control. No. 6006899
Folder No. 10774

APE (36 CFR 800.3(f)(2)). The Native American Heritage Commission was contacted about the project and provided your name as a possible source of information regarding potential Native American concerns in Trinity County. Reclamation, as the Federal agency approving this suite of restoration actions along the Trinity River, invites your input regarding the presence of any properties of religious and cultural significance within the APE for the areas of habitat restoration. If these historic properties are confidential, 800.11(c) allows Federal agencies to withhold this information from the public.

Please contact Amy Lawrence at 916-978-5040, or via email at alawrence@mp.usbr.gov if you have questions or comments regarding this effort to identify Native American cultural resources along this segment of the Trinity River.

Sincerely,

sgd Michael Nepstad

Michael Nepstad
Deputy Regional Environmental Officer

Enclosures

Identical Letters Sent To:

Ms. Tracy Edwards
Chairperson
Redding Rancheria
2000 Redding Rancheria Road
Redding, CA 96001

Ms. Barbara Murphy
Chief Executive Officer
Redding Rancheria
2000 Redding Rancheria Road
Redding, CA 96001

cc: Mr. Dean Prat
Regional Water Quality Control Board, Region 1
915 Capitol Mall, Room 364
Sacramento, CA 95814
(w/o encl)



IN REPLY
REFER TO:

United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Regional Office
2800 Cottage Way
Sacramento, California 95825-1898

MAY 17 2006

RECEIVED		MAY 24 2006	
By		MAY 22 '06	
BUREAU OF RECLAMATION NORTH-PACIFIC AREA OFFICE			
CODE			
IS3			
FILES			

MP-153
ENV-3.00

Council Leadership
Wintu Tribe and Toyon-Wintu Center
2675 Bechelli Lane
Redding, CA 96001

Subject: Compliance with Section 106 of the National Historic Preservation Act for Habitat Restoration Projects on the Trinity River near Indian Creek, Trinity County, California

Dear Council Leadership:

The Bureau of Reclamation is planning to continue its Trinity River Restoration Program (Restoration Program) with a series of habitat improvement activities along Trinity River near Indian Creek at the confluence of Trinity River and Weaver Creek. The project area extends from the confluence at Douglas City, California upstream for two river miles. Activities include removing stream side vegetation, removing berms, grading feathered stream edges, materials spoiling, and creating open flood plains. The proposed project provides the opportunity to:

- Increase the diversity and area of habitat for salmonids, particularly habitat suitable for rearing;
- Increase rearing habitat for juvenile salmonids, including coho, chinook, and steelhead;
- Increase the structural and biological complexity of habitat for various species of wildlife associated with riparian habitats;
- Increase hydraulic and fluvial geomorphic diversity and complexity;
- Measure/demonstrate the ecological response to changes in flow regimes, morphological features, and aquatic, riparian, and upland habitats.

Reclamation prepared an environmental impact statement for the larger Restoration Program and developed a programmatic agreement (PA) to manage the cultural resource compliance efforts. The Hoopa Valley Tribe signed the PA. In compliance with the PA and National Historic Preservation Act (NHPA) requirements, Reclamation conducted archeological inventories in the APE. This field work revealed mining features related to placer, hydraulic, and dredger mining during the late 1800s and early 1900s. No archeological resources were discovered, due, in part, to the extensive modification experienced within the project area.

Implementing regulations for Section 106 of the National Historic Preservation Act (NHPA) (16 USC 470 *et seq.*) require that Federal agencies seek information, as appropriate, from individuals

Classification ENV-3.00
Project GF
Control No. 6006921
Folder No. 10774

and organizations likely to have knowledge of, or concerns with, historic properties in the APE (36 CFR 800.4(a)(3)). The Native American Heritage Commission was contacted about the project and provided your name as a possible source of information regarding potential Native American concerns in Trinity County. Reclamation, as the Federal agency approving this suite of restoration actions along the Trinity River, invites your input regarding the presence of any properties of religious and cultural significance within the APE for the areas of habitat restoration. If these historic properties are confidential, 800.11(c) allows Federal agencies to withhold this information from the public. Reclamation would also like to inquire who the Council's leadership official(s) might be so that correspondence may be more efficiently directed for your convenience.

Please contact Amy Lawrence at 916-978-5040, or via email at alawrence@mp.usbr.gov if you have questions or comments regarding this effort to identify Native American cultural resources along this segment of the Trinity River.

Sincerely,

sgd Michael Nepstad

Michael Nepstad
Deputy Regional Environmental Officer

Enclosures

cc: Mr. Dean Prat
Regional Water Quality Control Board, Region 1
915 Capitol Mall, Room 364
Sacramento, CA 95814
(w/o encl)

bc: NC-153(BGuthermuth)
(w/o encl)

WBR:ALawrence:RHeredia:16 May 06:978-5040
I:\153\Archaeology\Projects\Northern California Area\Trinity River Restoration\06-NCAO-023
Indian Creek\Correspondence\Tribal Trinity Indian Creek nonfederal ltr2.doc

APPENDIX C

Data Point Photographs

**Life History and Habitat Needs for
Anadromous Salmonid Fish
in the Trinity River Basin**

Appendix G, Table 1**Life History and Habitat Needs for Anadromous Salmonid Fish in the Trinity River Basin**

Species	Migration	Spawning	Rearing	Habitat Requirements
Spring-run Chinook	Spring – Summer	Early Fall	Winter, Spring, Summer	Adults oversummer in deep, cool river pools. Spawns and rears in mainstem river and tributaries. Requires cool, swift water; clean, loose gravel for spawning; and shallow, slow-moving waters adjacent to higher water velocities for rearing and feeding.
Fall-run Chinook	Fall	Fall	Spring	Spawns and rears in mainstem river and tributaries. Requires cool, swift water; clean, loose gravel for spawning; and shallow, slow-moving waters adjacent to higher water velocities for rearing and feeding.
Winter-run Steelhead	Fall – Winter	February – April	Year-round	Spawns and rears in mainstem river and its tributaries. Requires cool, swift water; clean, loose gravel for spawning; runs and suitable pools in which to rear and over-summer; and clean cobble for refuge from high velocities. Juveniles overwinter for 1–2 or more years.
Summer-run Steelhead	Spring – Summer	February – April	Year-round	Adults ascend river and hold over in deep pools/runs through fall months. Spawns and rears in mainstem river and its tributaries. Requires cool, swift water; clean, loose gravel for spawning; suitable pools and riffles in which to rear and over-summer; and clean cobble for refuge from high velocities. Juveniles overwinter for 1–2 or more years.
Coho	October – December	November – December	Year-round	Spawns and rears in mainstem river and tributaries. Requires cool, swift water; clean, loose gravel for spawning; and suitable pools/runs in which to rear and over-summer. Juveniles prefer backwater/slackwater areas and pool margins; juveniles overwinter for 1 year.

Source: Leidy and Leidy 1984, Hassler 1987, U.S. Fish and Wildlife Service et al. 2000, Moyle 2002

Appendix G, Table 2**Life History and Habitat Needs for Non-Salmonid Native Anadromous Fish in the Trinity River Basin**

Species	Migration	Spawning	Rearing	Habitat Requirements
Pacific Lamprey	April – July	Spring – Early Summer	Year-round	Spawns and rears in the mainstem and tributaries. Requires cool streams with clean, gravelly bottom for spawning. Developing larvae burrow into silty river-bottom, where they remain for 4–5 years before metamorphosing and emigrating to the ocean.
Green Sturgeon White Sturgeon	February – July	March – July	Year-round	Adults spawn in large, mainstem river channels with cool water. Juveniles inhabit estuarine environments for 4–6 years before emigrating to the open ocean.
Eulachon	March – April	March – April	--	Adults run up into the lower reaches of coastal streams to spawn. Adhesive eggs stick to small gravel/sand/detrital bottom until hatched; larvae are quickly transported downstream to ocean.

Source: U.S. Fish and Wildlife Service et al. 2000, Moyle 2002

Appendix G, Table 3
Special-Status Fish Species Considered for Analysis

Common Name (Scientific Name)	Status FED/ST	General Habitat	Comments
Green sturgeon (<i>Acipenser medirostris</i>)	SSC/SC	Known to spawn in Sacramento, Feather, and Klamath rivers, and juveniles may occur in estuaries. Occurs in San Francisco, San Pablo, and Suisun bays and in the Delta. Prefers to spawn in large cobble; eggs fertilized in relatively high water.	The species may be found in the lower Trinity River, but is not known to inhabit the upper Trinity River. Project boundaries are outside the known range of the species.
Pacific lamprey (<i>Lampetra tridentata</i>)	NW/--	Spawn in freshwater rivers and streams with juveniles found in slow-moving current, silty bottom habitats; metamorphosed juveniles migrate through estuaries to the ocean.	Observed to spawn in tributaries of the upper river (Deibel 1988); Ammoeetes abundant during spring near the project reach. The species may occur at the Lewiston-Dark Gulch Rehabilitation Sites.
Southern Oregon/ Northern California Coasts ESU coho salmon (<i>Oncorhynchus kisutch</i>) Designated critical habitat	T/T	Juveniles prefer deep (≥ 1 m) pools with dense overhead cover and clear water. Found over a range of substrates from silt to bedrock (Moyle et al. 1995). Trinity River is designated critical habitat and essential fish habitat for the species.	Suitable spawning, rearing, and/or migration corridor habitat exists at the Canyon Creek project sites. The Lewiston-Dark Gulch Rehabilitation Sites are within designated critical habitat for SONCC coho salmon. The species is known to occur at the Lewiston-Dark Gulch Rehabilitation Sites.
Klamath Mts. Province ESU steelhead (<i>Oncorhynchus mykiss irideus</i>) (summer/fall- and winter- run races)	NW/SSC	Freshwater rivers and streams (Trinity and Klamath Rivers and their tributaries). Steelhead require cool, swift, shallow water; clean, loose gravel for spawning; and suitable large pools in which to spend the summers (CNDDB, 2002).	Summer-run race is a state species of special concern. Suitable spawning, rearing, and/or migration corridor habitat exists at or near the project sites. The species is known to occur at the Lewiston-Dark Gulch Rehabilitation Sites.
Upper Klamath-Trinity Rivers ESU Chinook salmon (<i>Oncorhynchus tshawytscha</i>) (spring- and fall-run races)	NW/SSC	Freshwater rivers and streams. (Trinity and Klamath Rivers and their tributaries). Chinook salmon require cool streams with deep pools and riffles and gravel or cobble substrate. Trinity River is designated essential fish habitat for the species.	Spring-run race is a state species of special concern. Suitable over-summering, spawning, rearing, and migration corridor habitat exists at or near the Lewiston-Dark Gulch Rehabilitation Sites. The species is known to occur at the Lewiston-Dark Gulch Rehabilitation Sites.

Notes:

Federal (FED) and State (ST) Status Codes:

E = Endangered; T = Threatened; C = Candidate Species; NW = Not Warranted for Listing; SC = Species of Concern; SSC = Species of Special Concern

Fisheries Management Indicator Species Report

Fisheries Management Indicator Species Report

Chapter 1 Introduction

The purpose of this report is to evaluate and disclose the impacts of the Lewiston–Dark Gulch Rehabilitation Project on the fisheries Management Indicator Species (MIS) identified in the Shasta–Trinity National Forest (NF) Land and Resource Management Plan (LRMP) (USDA 1995). This report documents the effects of three alternatives; No Action, the Proposed Action, and Alternative 1 for the Lewiston–Dark Gulch Rehabilitation Project on the habitat of selected MIS. Detailed descriptions of the Lewiston–Dark Gulch Rehabilitation Project alternatives are found in Chapter 2 of the Lewiston–Dark Gulch Rehabilitation Project Environmental Analysis (USBR 2007).

The Shasta–Trinity National Forest LRMP selected three fisheries assemblages (USDA 1995, Pages 3-11) and five fisheries management indicator species were selected to represent those assemblages. Management Indicator Species fish that were chosen in the Forest Land and Resource Management Plan (LRMP) (USDA Forest Service 1995a) represent several fish assemblages (Table 1) that are present on the Forest.

Table 1. Shasta Trinity National Forest Management Indicator Species Fishes

Fish Assemblage	Group MIS Representative
Anadromous commercial/recreational sportfish	Spring-Run chinook (South Fork Trinity River only) Winter-run steelhead
Anadromous threatened, endangered & sensitive sportfish	Spring-run (summer) steelhead (South Fork Trinity River only)
Inland coldwater sportfish	Rainbow trout
Inland warmwater sportfish	Largemouth bass

Inland coldwater sportfish are only addressed in watersheds where longstanding natural barriers or dams have blocked migration of anadromous fishes and inland warmwater sportfish are addressed in only in warmwater lakes. Several other MIS representatives are addressed only in the South Fork Trinity River (Spring-run Chinook and Spring-run steelhead) (USDA 1995b). The Lewiston–Dark Gulch Rehabilitation Project is located

within an anadromous fish watershed within the Trinity River upstream of the South Fork Trinity River; therefore winter-run steelhead is the appropriate MIS fish representative for this project.

The LRMP was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). Agency guidance for Forests that have plans developed under the 1982 planning rule directs Forest Service resource managers to (1) at the project scale, analyze the effects of proposed projects on the habitats of each management indicator assemblage affected by such projects, and (2) at the national forest (forest) or bioregional scale, monitor habitat trends of forest management indicator assemblages as identified by the LRMP, and monitor the population trends for their selected representative species.

The Shasta-Trinity National Forest LRMP also established nine wildlife assemblages as management indicators and identified those in the Shasta-Trinity Land and Resource Management Plan (USDA 1995, Pages 3-24 through 3-26).

1.a. Direction Regarding the Analysis of Project-Level Effects on Management Indicator Assemblage Habitat

Project-level effects on management indicator assemblages are analyzed and disclosed as part of environmental analysis under the National Environmental Policy Act (NEPA). This involves examining the impacts of the proposed project alternatives on management indicator assemblage habitat by discussing how direct, indirect, and cumulative effects will change the quantity and/or quality of assemblage habitat in the analysis area.

These project-level impacts to habitat are then related to broader scale. The Shasta-Trinity NF LRMP allows for either population or habitat monitoring, or to **“use appropriate indicator species or habitat components to represent the assemblage”** (USDA 1995, pages 5-16). Consistent with the LRMP, population monitoring and survey data are generally not gathered for site-specific projects. For the selected management indicator assemblages, project-level effects analysis can be informed by forest-scale habitat monitoring and analysis alone.

For the selected management indicator assemblages, project-level effects analysis can be informed by forest-scale habitat monitoring and analysis alone. The Shasta-Trinity NF LRMP requirements for management indicators analyzed for the Lewiston-Dark Gulch Rehabilitation Project are summarized in Section 3 of this report.

Therefore, adequately analyzing project effects to management indicator assemblages, including Threatened, Endangered, and Sensitive (TES)

species that are adequate representatives of the assemblages, involves the following steps:

- Identifying which management indicator assemblages have habitat that would be either directly or indirectly affected by the project alternatives; these assemblages are potentially affected by the project.
- Disclosing the LRMP forest-level or bioregional-level monitoring requirements for this subset of forest management indicator assemblages.
- Analyzing project-level effects on management indicator assemblage habitats or habitat components for this subset.
- Discussing the forest scale habitat trends and/or the bioregional population trends of representative species for this subset.
- Relating project-level impacts on management indicator assemblage habitat to habitat at the forest scale and/or to population trends of representative species of the affected assemblages at the forest or bioregional scale.

1.b. Direction Regarding Monitoring of Management Indicator Assemblage Habitat or Population Trends at the Forest or Bioregional Scale

Forest or bioregional scale monitoring requirements for the Shasta–Trinity NF’s fisheries program are found in the Monitoring Action Plan of the LRMP (USDA 1995, pages 5-8 to 5-9). Relative to fish and management indicator species, the Shasta–Trinity NF LRMP did not specify or commit to any particular monitoring program or plan. Although the LRMP monitoring plan specifies a number of monitoring techniques for fisheries and aquatic species, none of them are specific for MIS monitoring and our fisheries MIS has no specific requirements for monitoring. The wildlife section specifically allows for monitoring of either habitat or representative species.

The Forest Service manages fish populations to maintain viable populations of wild, native fish (rainbow trout, salmon and steelhead) or to enhance fish populations of wild or introduced (largemouth and smallmouth bass) species. The Forest selected management indicators to ensure that viable populations of these species are maintained. Management indicators act as ‘barometers’ for aquatic communities and can be used for predicting habitat capability responses to management activities.

Table 2. Shasta Trinity NF Monitoring Proposals for the Fisheries Program for species and assemblages related to the selected MIS and Management Indicator assemblages (USDA 2006)

Management Indicator Assemblage	Management Indicator Species	LRMP Monitoring Activities, Practices or Effects for Fisheries ^a			
		Activity, Practice or Effect	Techniques and/or data sources	Intensity and standard	Frequency
Anadromous fish assemblage	Winter-run steelhead	Anadromous fish population surveys	Snorkling of five long term index streams for sensitive species; three long term index streams for non-sensitive species.	Direct observation counts of returning adults.	Yearly

^aNone of the items in the fisheries monitoring program specifically refers to MIS. However, independent commitments for monitoring fish inform MIS analysis (LRMP, Monitoring Action Plan, pages 5-8 and 5-9, USDA 1995.)

Habitat Components: Status and Trend

The Shasta–Trinity NF LRMP (USDA 1995) requires forest-scale monitoring of habitat status and trend for the selected management indicator assemblages and species on the Shasta–Trinity NF. For management indicator assemblages with habitat potentially affected by the Lewiston–Dark Gulch Rehabilitation Project, these habitat monitoring requirements are summarized in Tables 2 and 4 of this report. Habitat status is the current amount of assemblage habitat on the Shasta–Trinity NF. Habitat trend is the direction of change in the amount of habitat between the time the LRMP was approved and the present.

Assemblage habitats are composed of the structural features (for example, stream bed, water temperature, etc.) and any special habitat elements (for example, logs in the water, resting pools, etc.) associated with a particular management indicator assemblage. “Habitat components” refers to those key characteristics that typify the category, such as water temperature, water body type (stream, lake, etc.) These categories may mutually overlap and any given mile of stream or lake may or may not be categorized with several assemblage types.

Management indicator assemblage habitat trend is monitored using historic fish habitat surveys, watershed condition class modeling and baseline assessment using the Shasta Trinity National Forest Tributaries Matrix of Factors and Indicators as revised by the STNF Level 1 team. These data include spatially explicit ecological layers created from remote-sensing

imagery. This data is verified using photo-imagery, on-the-ground measurements, and tracking of streambed-changing actions or events (for example, landslides).

Appropriate Indicator Species: Population Status and Trend

The Monitoring Action Plan of the LRMP (USDA 1995, pages 5-8 through 5-9) offers some techniques through which the Forest tracks management indicator species. The monitoring requirements for the management indicator assemblages with habitat potentially affected by the Lewiston–Dark Gulch Rehabilitation Project are summarized in Table 2 and 4 of this report. All monitoring data are collected and/or compiled at the forest or bioregional scale, consistent with the LRMP.

Population status is the current trend of the selected representatives of the affected assemblage. Population trend is the direction of change in that population measured over time.

There is a wide range of monitoring data that can be used professionally to describe the status and trend (or change) of populations. This data ranges from describing changes in distribution based on presence-absence data to describing changes in population structure. Distribution population monitoring consists of collecting presence data for the management indicator assemblage representatives across a number of sample locations; over time, changes in the distribution of a representative species can be identified and tracked. Presence data is collected using a number of direct and indirect methods, such as snorkeling surveys (population surveys), creel counts, and so forth.

Population data for species that have been selected to represent the management indicator assemblages are collected and consolidated by the Shasta–Trinity NF in cooperation with State and Federal agency partners (including the California Department of Fish and Game, National Marine Fisheries Service (NMFS, also known as NOAA Fisheries), the U.S. Geological Survey, and USDI Fish and Wildlife Service). Population data at various scales are important to both assess and provide meaningful context for population status and trend at the forest scale.

Chapter 2 Selection of Project level Management Indicator Assemblages

Fisheries management Indicator Assemblages and species for the Shasta–Trinity NF are identified in the LRMP (USDA 1995, page 3-11). The

management indicator assemblages analyzed for the Lewiston–Dark Gulch Rehabilitation Project were selected from this list of assemblages identified in the LRMP, as indicated below in Table 3. Table 3 identifies the management indicator assemblages, categorizes them relative to the effect the project is likely to have on them, and lists the representative species (3rd column).

Table 3. Management indicator assemblages and optional selection of representative species for Project-Level Analysis for the Lewiston–Dark Gulch Rehabilitation Project

Management Indicator Assemblages	Selected Assemblage Representative	Category for Project Analysis ¹
Anadromous fish assemblage	Winter-run steelhead	3
Anadromous fish assemblage	Spring-run chinook, South Fork Trinity River only	1
Anadromous fish assemblage	Summer steelhead, South Fork Trinity River only	1
Inland coldwater fish assemblage	Rainbow trout	1
Inland warmwater fish assemblage	Largemouth bass	1

Category 1: Management indicator assemblages whose habitat are not in or adjacent to the project area, or were selected as indicators for specific areas outside the project area, which would not be affected by the project.

Category 2: Management indicator assemblage whose habitat is in or adjacent to project area, but would not be either directly or indirectly affected by the project.

Category 3: Management indicator assemblage whose habitat would be either directly or indirectly affected by the project.

The following assemblages and species were identified as Category 1. Spring-run Chinook salmon and winter-run steelhead are present within the project area, but were identified in the LRMP as indicators for the South Fork Trinity River, which is outside the analysis area. Largemouth bass will not be further discussed because the habitat factors for this species are not in or adjacent to the project area. Rainbow trout are representative of the inland coldwater fish assemblage, which is restricted to inland non-anadromous lakes, streams, and rivers. Inland fish habitat is not present within the project area, and will not be considered further in this document. No species were identified as Category 2 above.

The MIS whose habitat would be either directly or indirectly affected by the Lewiston–Dark Gulch Rehabilitation Project, identified as Category 3 in Table 3, are carried forward in this analysis, which will evaluate the direct, indirect, and cumulative effects of the proposed action and alternatives on the habitat of these MIS. The management indicator assemblages selected

for project-level analysis for the Lewiston–Dark Gulch Rehabilitation Project is the Anadromous Fish Assemblage. The MIS selected for Project-Level MIS analysis for the Lewiston–Dark Gulch Rehabilitation Project is winter-run steelhead.

Chapter 3 LRMP Monitoring Requirements for Management Indicator Assemblages Selected for Project-Level Analysis

3.a. Management Indicator Assemblages Monitoring Requirements

The Shasta–Trinity NF LRMP (USDA 1995, page 3-11) identifies three forest fisheries management indicator assemblages. The LRMP Monitoring Action Plan on pages 5-8 and 5-9 describes forest and bioregion scale monitoring proposals for the Shasta–Trinity NF management indicator assemblages. Habitat and population monitoring results for the Shasta–Trinity NF’s management indicator assemblages are summarized below for the management indicator assemblages being analyzed for the Lewiston–Dark Gulch Rehabilitation Project.

Table 4. Shasta–Trinity NF LRMP Management Indicator Assemblages Monitoring Requirements for the Selected Project-Level Assemblages for the Lewiston–Dark Gulch Rehabilitation Project (USDA 1995)

Selected Project-Level Management Indicator Assemblages	Project Level Management Indicator Assemblage Monitoring Requirements	
	Species	Habitat
Anadromous fish assemblage	Winter-run steelhead	Watershed condition class

^a LRMP, Monitoring Plan (USDA 1995, pages 5-8 & 5-9).

3.b. How MIS Monitoring Requirements are Being Met

The Shasta Trinity LRMP requires anadromous fish population surveys in several long term index streams. Anadromous fish that are present during summer, such as spring-run Chinook salmon and summer-run steelhead are counted using direct observation (snorkeling) by multi-agency crews, while those that return during fall and winter months (winter-run steelhead) are

monitored by the California Department of Fish and Game through weir counts and recapturing of marked fish (CDFG 2005). Resident rainbow trout in these systems cannot be distinguished from steelhead, and therefore are counted as steelhead during surveys in these systems. In non-anadromous streams, rainbow trout are monitored in several indicator streams in various locations on the Forest.

Monitoring of Assemblage Habitat Components:

As noted above, the Shasta Trinity monitors the changes in stream conditions occurring on the Forest over time. Aquatic disturbance in forest ecosystems occurs at various scales through relatively common events such as landslides, forest succession, wildfire, windthrow, and floods, and through uncommon events such as volcanic activity, glacial activity and climatic change (Oliver and Larson 1990). Floods, landslides, forest succession, all affect stream and water body conditions over time, allowing some species to out-compete others in a particular area with particular conditions.

By monitoring large-scale disturbance events on the Forest, decision makers can evaluate their stewardship opportunities and responsibilities to better inform their decisions.

Habitat Component Monitoring. Each of the three fisheries assemblages is characterized by a suite of features that distinguish it from the others. For example, a stream or reach of a stream cannot be categorized as part of the cold-water fish assemblage without water temperatures meeting certain minimums. These key components allow us to identify and monitor the distribution and quantity of habitat assemblage types over time. Each of these components is a reliable indicator for the more complex entity that is the assemblage.

Table 5. Components for the Fisheries Management Indicator Assemblage monitoring on the Shasta Trinity NF (USDA 2007)

Management Indicator Assemblage	Components for Analysis
Anadromous fish assemblage	Consistent with LRMP direction, populations are used to meet monitoring requirements on a Forest-scale. Limited habitat surveys are also completed.

Species Population Trend Monitoring. To supplement the habitat information provided by Forest level analysis, the Shasta–Trinity National Forest also monitors the population trends of selected species.

Chapter 4 Description of Proposed Project

The Lewiston – Dark Gulch Rehabilitation Project was designed to increase juvenile salmonid rearing habitat on the mainstem Trinity River. A detailed description of each of the Alternatives can be found in the Lewiston–Dark Gulch Rehabilitation Project Environmental Assessment.

Chapter 5 Effects of Proposed Project on Selected MIS

This section will compare forest-level population trends of the selected fisheries MIS with project-level impacts from the alternatives related to the Lewiston–Dark Gulch Rehabilitation Project on fisheries habitat and population impacts. Each MIS forest-level population will be addressed first and then project-level impacts will be addressed for the MIS.

Steelhead Introduction

The National Marine Fisheries Service recognizes two distinct reproductive ecotypes of coastal steelhead in the Klamath based upon their reproductive biology and freshwater spawning strategy (Busby et al. 1996). Burgner et al. (1992) identified the stream-maturing type as entering the river sexually immature and still requiring several months before ripening to spawning condition. In the Klamath River, Busby et al. (1996) called these summer steelhead and found they migrated upstream between April and October with a peak in spawning behavior during January. The second type, ocean-maturing or winter steelhead, enters the Klamath River between September and March with a peak in spawning in March. These fish enter the river sexually mature and spawn shortly after reaching spawning grounds (Busby et al., 1996). The overlap in migration and spawning periods make differentiating these ecotypes difficult (Roelofs, 1983). A genetic study determined that different runs of steelhead within a particular subbasin of the Klamath-Trinity system shared more genetic similarities than populations of similar run-timings in adjacent basins (Reisenbichler et al., 1992). Klamath Mountains Province Steelhead (both “summer” and “winter” runs) is a Forest Service Sensitive species.

5.a. Winter Steelhead

Additional information on affected environment and environmental consequences of the Lewiston–Dark Gulch Rehabilitation Project on

Steelhead is found in the Lewiston–Dark Gulch Rehabilitation Project BE/BA.

5.a.1. Habitat/Species Relationship

Detailed information on this management indicator assemblage for the Shasta–Trinity NF is documented in the Shasta–Trinity National Forest Management Indicator Assemblage Report (USDA 2006), which is hereby incorporated by reference. As mentioned above, the Shasta–Trinity NF monitors populations to meet forest wide MIS monitoring requirements.

Winter-run steelhead are not at risk of extinction but their numbers have been reduced from historic levels. Local anglers on the Trinity River reported a substantial decline in the abundance of winter steelhead following the 1964 flood. This observation is consistent with findings of Rodgers (1972, 1973, as cited in PWA 1994). There are no current adult return estimates for winter-run steelhead.

NOAA Fisheries has reviewed the current population levels and long-term population trends of West Coast Salmon and Steelhead. NOAA Fisheries also considered available information on resident rainbow trout. Preliminary conclusions are that KMP steelhead are not likely to become endangered in the foreseeable future, and that Federal ESA listing is not currently warranted within the KMP ESU (NOAA Fisheries 2003).

No long-term data is available to evaluate Klamath River basin steelhead population trends. An unpublished report estimated a basin wide annual run size of 283,000 adult steelhead (spawning escapement + harvest) in 1965. Busby et al. (1994 in Moyle, 2002) reported winter steelhead runs in the basin to be 222,000 during the 1960's. Based on creel and gill net harvest data, the winter-run steelhead population was estimated at 10,000 to 30,000 adults annually in the early 1980's (Hopelain, 2001). Population estimates of summer steelhead have also declined precipitously during the 1990's. The apparent decrease in population size of steelhead in the Klamath River basin has multiple causes. Main factors impacting steelhead in the Klamath Basin include hatcheries, harvest, hydroelectric operations, and human impacts.

5.b. Project-level Effects Analysis based on Habitat

Key Habitat Factor(s) for the Analysis

The unit of measure used to analyze effects on MIS fish is the proper functioning condition of subwatersheds based on Watershed Condition Class (WCC). The condition of individual watersheds is highly indicative of the instream and near stream conditions that exist within that watershed.

The WCC score (which ranges from I to III, with I representing a properly functioning condition) is a derivative of the cumulative watershed effects modeling/analysis that is completed during the hydrologic analysis of a watershed. Site visit and instream survey results have been used to validate the cumulative watershed effects model.

Table 6. Current Watershed Condition Class values for the 7th field sub-watershed in the Lewiston–Dark Gulch Rehabilitation Project

HUC7	Watershed Name (7 th Field Drainages)	TOC (\$) 2/	Harvest & Fire 3/	Roads 4/	Current 5/	% ERA 6/	Current Risk Ratio % ERA / %TOC)
180102116080102	Hoadley Gulch–Trinity River	16.0%	238.7	150.1	388.8	4.7%	0.29

Table 7 summarizes the expected changes in Watershed Condition Class (WCC – a representative measure of project impacts on area watercourses) associated with each of the alternatives proposed in the Lewiston–Dark Gulch Rehabilitation Project EA.

Table 7. Watershed Condition Class values for the 7th field sub-watershed in the Lewiston–Dark Gulch Rehabilitation Project for each alternative

7 th Field Subwatershed	Existing – No Action	Proposed Action	Alternative 1
	WCC	WCC	WCC
Hoadley Gulch – Trinity River	I	I	I

Since WCC values for the project area are already in condition class I (properly functioning), and the proposed action alternatives would improve habitat conditions, the condition class would remain unchanged.

No Action

Direct, Indirect, and Cumulative Effects to Habitat. No direct effects to fish habitat will occur as there will be no activities or causal mechanisms to impact fish habitat. Existing status and trends would likely continue.

Proposed Action and Alternative 1

These two alternatives were developed to address the purpose and need of the Lewiston–Dark Gulch Rehabilitation Project and address issues identified during the scoping period. The expected effects to fisheries,

fisheries habitat and WCC related to the Proposed Action and Alternatives 1 of the Lewiston–Dark Gulch Rehabilitation Project are expected to be virtually identical based on the minor differences between the alternatives, and therefore have been grouped for effects analysis.

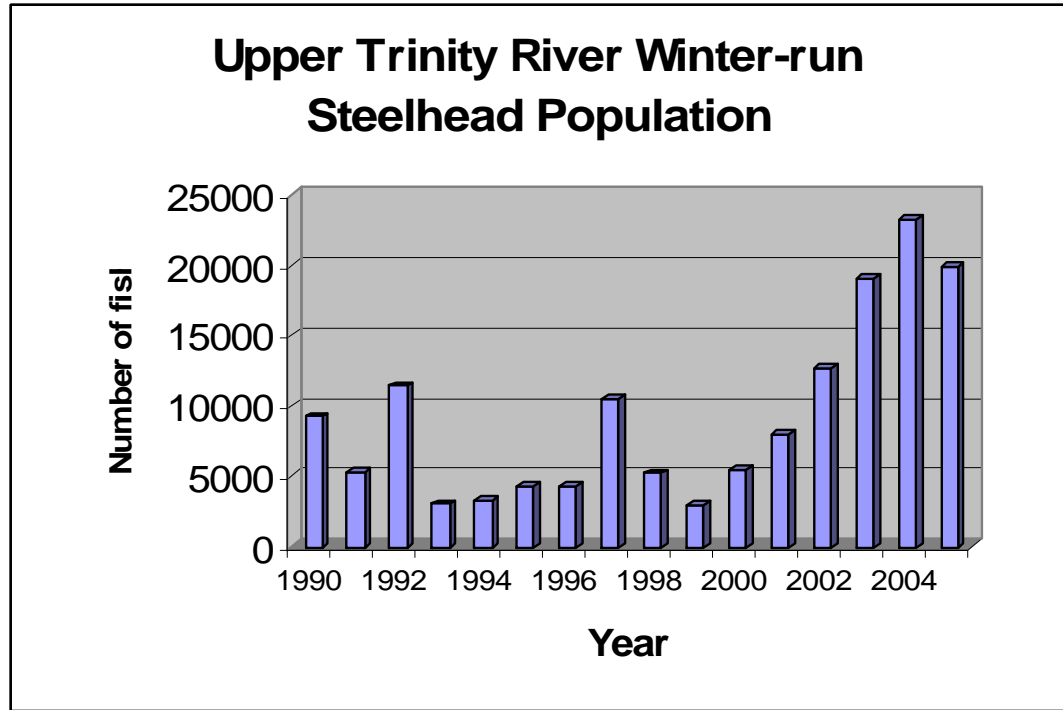
Direct and Indirect Effects to Habitat. These two alternatives were developed specifically to improve spawning and rearing habitat for salmonids, therefore effects are expected to be beneficial. The grading, excavating, and coarse sediment addition are expected to increase both habitat quantity and quality. Any potential for negative effects to MIS fish species is expected to be of short duration. Project activities located within the active channel have the potential to temporarily increase fine sediment levels. Effects from sedimentation and in-channel activities may temporarily displace MIS fish species, but are not expected to adversely impact spawning due to the timing limitations which require the work to be conducted outside the spawning season. Any temporary negative effects are expected to be far outweighed by the improved habitat conditions the project was designed to facilitate.

Cumulative Effects to Habitat. Since this and other projects along the Trinity River were designed to improve habitat quantity and quality, and negative effects associated with this and similar projects are of short duration, and of limited magnitude, no negative cumulative effects are anticipated. Conversely, successful implementation of this and similar projects within the Trinity River watershed are expected to have beneficial cumulative effects on salmonid habitat.

Summary of Habitat and Population Status and Trend at the Forest/Bioregional Scale

The Shasta–Trinity NF LRMP requires forest-scale population monitoring for MIS fish species. The sections below summarize the population status and trend data for MIS fish.

Figure 1. Upper Trinity River Steelhead population since 1990



Relationship of Project-Level Impacts to Forest and Bioregional-Scale Population Trends for MIS Fish

The cumulative effects of the Action Alternatives of the Lewiston–Dark Gulch Rehabilitation Project will not result in any decreases in forest-level populations of MIS fish. The Lewiston–Dark Gulch Rehabilitation Project will improve fisheries habitat at the project-level. Therefore, the impact of the Lewiston–Dark Gulch Rehabilitation Project will improve the existing forest-wide habitat or population trends.

Chapter 6 References Used and Literature Cited

- Agee, J.K. 1993. Fire ecology of Pacific Southwest forests. Island Press. Covelo, California.
- Baltz, D.M. and P.B. Moyle. 1984. "Segregation by species and size classes of rainbow trout, *Salmo gairdneri*, and Sacramento sucker, *Catostomus occidentalis*, in three California streams." *Environmental Biology of Fish* 10: 101-110.
- Behnke, R. J. 2002. Trout and Salmon of North America. The Free Press, New York NY.
- Boles, G.L. 1990. "Food habits of juvenile wild and hatchery steelhead trout, *Oncorhynchus mykiss*, in the Trinity River, California." *Inland Fisheries Administrative Report* No 90-10.
- Borok, S.L. and H.W. Jong. 1997. "Evaluation of salmon and steelhead spawning habitat quality in the South Fork Trinity River basin, 1997." *Inland Fisheries Administrative Report* No. 97-8.
- Britain, J.E. and T.J. Eikeland. 1988. "Invertebrate drift- a review." *Hydrobiologia*. 166:77-93.
- Brown, L.R. and P.B. Moyle. 1991. "Changes in habitat and microhabitat partitioning within an assemblage of stream fishes in response to predation by Sacramento squawfish (*Ptychocheilus grandis*)." *Canadian Journal of Fisheries and Aquatic Science*. 43:849-856.
- Burgner, R.L., J.T. Light, L. Margolis, T. Okazaki, A. Tautz and S. Ito. 1992. "Distribution and origins of steelhead trout (*Oncorhynchus mykiss*) in offshore waters of the North Pacific Ocean." *International North Pacific Fisheries Commission Bulletin* No. 51. *In* Busby *et al.* (1996).
- Burns, J.W. 1972. "Some effects of logging and associated road construction on Northern California Streams." *Transactions of the American Fisheries Society*. 101:1-17.
- Busby, P.J., T.C. Wainwright, R.S. Waples. 1994. Status review of Klamath Mountain Province steelhead. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-NWFSC-19. 261 pages.

Busby, P.J., T.C. Wainwright, G.J. Bryant, L.J. Lierheimer, R.S. Waples, F.W. Waknitz, and I.V. Lagomarsino. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon, and California. National Marine Fisheries Technical Memorandum NMFSNWFSC-27. Seattle WA. 261 pages.

California Department of Fish and Game/U.S. Fish and Wildlife Service (CDFG/USFWS). 1956. A plan for the protection of fish and wildlife resources affected by the Trinity River Division, Central Valley Project. Prepared jointly by California Department of Fish and Game and the U.S. Fish and Wildlife Service. 76 pp.

California Department of Fish and Game (CDFG). 2001. "Final report on anadromous salmonid fish hatcheries in California." California Department of Fish and Game and National Marine Fisheries Service Southwest Region Joint Hatchery Review Committee. Review draft, June 27, 2001.

CDFG 2005, Annual Report Trinity River Basin Salmon and Steelhead Monitoring Project 2004-2005, Redding CA.

Chamberlin, T. W., R. D. Harr, and F. H. Everest. 1991. Timber harvesting, Silviculture, and watershed processes. Pages 181-205 in W.R. Meehan (ed.), Influences of Forest and Rangeland Management. American Fisheries Society Special Publication 19. Bethesda, MD. 751pp.

Everest, F.H. and D.W. Chapman. 1972. "Habitat selection and spatial interaction by juvenile Chinook salmon and steelhead trout in two Idaho streams." Journal of the Fisheries Research Board of Canada. **29**:91-100.

Everest, F.H., Armantrout, N.B., Keller, S.M., Parante, W.D., Sedell, J.R. Nickelson, T.E. Johnson, J.M., and Haugen, G.H. 1985. Salmonids. In Management of wildlife and fish habitats in forests of western Oregon and Washington. Edited by E.R. Brown. Publ. R6-Fand WL-192-1985, Pacific Northwest Experiment Station, USDA Forest Service, Portland, OR. pp.199-230.

Furniss, M. J., T. D. Roelofs, and C. S. Yee. 1991. Road construction and maintenance. Pages 297-323 in W.R. Meehan (ed.), Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication 19. Bethesda, MD. 751 pages.

- Hardy, T.B. and R.C. Addley. 2001. "Evaluation of interim instream flow needs in the Klamath River. Phase II. Final Report." Institute for Natural Systems Engineering." Utah Water Research Laboratory. Utah State University. Logan UT.
- Harvey, B.C. and R.J. Nakamoto. 1997. "Habitat-dependent interactions between two size classes of juvenile steelhead in a small stream." Canadian Journal of Fisheries and Aquatic Sciences. **54**:27-31.
- Harvey, B.C., J.L. White, and R.J. Nakamoto. 2002. "Habitat relationships and larval drift of native and nonindigenous fishes in neighboring tributaries of a coastal California river." Transactions of the American Fisheries Society. **131**: 159-170.
- Haskins, D.M. 1986. A Management Model for Evaluating Cumulative Watershed Effects; Proceedings from the California Watershed Management Conference, West Sacramento, CA, November 19-20, 1986, pp125-130.
- Hawkins, D.K. and T.P. Quinn. 1996. "Critical swimming velocity and associated morphology of juvenile coastal cutthroat trout (*Oncorhynchus clarki clarki*), steelhead trout (*Oncorhynchus mykiss*), and their hybrids." Canadian Journal of Fisheries and Aquatic Science **53**:1487-1496.
- Healey, M.C. 1991. "Life history of chinook salmon (*Oncorhynchus tshawytscha*)." Pages 311-394 in C. Groot and L. Margolis, eds. Pacific salmon life histories. University of British Columbia Press. Vancouver, B.C., Canada.
- Hopelain, J.S. 1998. "Age, growth, and life history of Klamath River Basin steelhead (*Oncorhynchus mykiss irideus*) as determined from scale analysis." Inland Fisheries Administrative Report 98-3.
- Hopelain, J.S. 2001. "Lower Klamath River angler creel census with emphasis on upstream migrating fall Chinook salmon, coho salmon, and steelhead trout during July through October, 1983 through 1987." Inland Fisheries Administrative Report 01-1.
- Israel J.A. 2003. Life History, Ecology, and Status of Klamath River Steelhead. Unpublished.
- Jong, H.W. 1997. "Evaluation of Chinook spawning habitat quality in the Shasta and South Fork Trinity River, 1994." Inland Fisheries Administrative Report 97-5.

- Keeley, E.R. and J.D. McPhail. 1998. "Food abundance, intruder pressure, and body size as determinants of territory size in juvenile steelhead trout (*Onchorhynchus mykiss*).” Behavior **135**:65-82.
- Kesner, W.D. and R.A. Barnhardt. 1972. "Characteristics of the fall-run steelhead trout (*Salmo gairdneri gairdneri*) of the Klamath River system with emphasis on the half-pounder.” California Fish and Game **58**: 204-220.
- McEwan, D. and T.A. Jackson. 1996. "Steelhead Restoration and Management Plan for California.” Department of Fish and Game.
- McMichael, G.A., T.N. Pearson, and S.A. Leider. 1999. "Behavioral interactions among hatchery-reared steelhead and wild *Oncorhynchus mykiss* in natural streams.” North American Journal of Fisheries Management **19**: 948-956.
- Moffett, J.W. and S.H. Smith 1950. Biological Investigations of the Fishery Resources of the Trinity River, California. Special Scientific Report No. 12, U.S. Fish and Wildlife Service; 71pp.
- Moyle, P.B. and D.M. Baltz. 1985. "Microhabitat use by an assemblage of California stream fishes: Developing criteria for instream flow determinants.” Transactions of the American Fisheries Society. 114:695-704.
- Moyle, P. B. 2002. Inland Fishes of California, University of California Press, Berkeley CA.
- Nakamoto, R. 1994. "Characteristics of pools used by adult summer steelhead oversummering in the New River, California.” Transactions of the American Fisheries Society. 123: 757-765.
- Nickelson, T.E., M.F. Solazzi, and S.L. Johnson. 1986. "Use of hatchery coho salmon (*Oncorhynchus kisutch*) presmolts to rebuild wild populations in Oregon coastal streams.” Canadian Journal of Fisheries and Aquatic Sciences. 43:2443-2449.
- Nielsen, J.L. and T.E. Lisle. 1994. "Thermally stratified pools and their use by steelhead in Northern California streams.” Transactions of the American Fisheries Society 123:613-626.

- NMFS (National Marine Fisheries Service). 2001. "Notice of Determination; endangered and threatened species: final listing determination for Klamath Mountains Province steelhead." Federal Registrar [Docket No. 010118020-1082-02, 04 April 2001] 66(65): 17845-17856.
- ODFW (Oregon Department of Fish and Wildlife). 1995. "Biennial report on the status of wild fish in Oregon." Oregon Department of Fish and Wildlife. Portland OR.
- Reisenbichler, R.R., J.D. McIntyre, M.F. Solazzi, and S.W. Landing. 1992. "Genetic Variation in steelhead of Oregon and northern California." Transaction of the American Fisheries Society 121:158-169.
- Ricker, S.J. 1997. "Evaluation of salmon and steelhead spawning habitat quality in the Shasta River basin, 1997." Inland Fisheries Administrative Report 97-9.
- Roelofs, T.D. 1983. "Current Status of California summer steelhead (*Salmo gairdnerii*) stocks and habitat, and recommendations for their management." Report to the U.S. Forest Service, Region 5.
- Shapovalov, L. and A.C. Taft. 1954. "The life history of the steelhead rainbow trout (*Salmo gairdneri*) and silver salmon (*Oncorhynchus kisutch*) with special reference to Waddell Creek, California and recommendations regarding their management." California Fish and Game, Fish Bulletin No. 98.
- Skinner, C. N., and C. Chang. 1996. Fire regimes, past and present. In: Sierra Nevada Ecosystem Project: Final report to Congress. Vol. II: Assessments and scientific basis for management options. Wildland Resources Center Publication No. 37. Centers for Water and Wildland Resources, University of California, Davis, 1041-1070.
- Smith, J. 1981. Effects of Trinity Dam on the habitat and the fishery of the Trinity River: a lifetime perspective. In: California Trout Symposium, Proceedings, 1981. Mr. Smith is a former Supervisor of Trinity County.
- Snyder, J.O. 1931. Salmon of the Klamath River, California. Cal. Dept. of Fish and Game, Fish Bull. No. 34.
- Spence, B.C., G.A. Lomnický, R.M. Hughes, and R.P. Novitki. 1996. An ecosystem approach to salmonid recovery. TR-4501-96-6057. ManTech Environmental Research Service Corp. Corvallis, OR.

- Sullivan, K., S.H. Duncan, P.A. Bisson, J.T. Heffner, J.W. Ward, R.E. Bilby, and J.L. Nielson. 1987. A summary report of the Deschutes River Basin: sediment, flow, temperature and fish habitat. Research Report, Paper N0. 044-5002/87/1. Weyerhaeuser, Federal Way, Washington.
- USDA, Forest Service. 1995a. Shasta–Trinity National Forests Land and Resource Management Plan. Shasta–Trinity National Forests, Redding CA.
- USDA, Forest Service. 1995b. Final Environmental Impact Statement, Shasta–Trinity National Forests Land and Resource Management Plan. Shasta–Trinity National Forests, Redding CA.
- USDA, Forest Service. 2002. Rush Creek Stream Condition Inventory Report. Unpublished Report. Weaverville Ranger District, Weaverville, CA.
- USDA, Forest Service. 2003a. Little Browns Creek Stream Condition Inventory Report. Unpublished Report. Weaverville Ranger District, Weaverville, CA.
- USDA, Forest Service. 2003b. East Weaver Creek Stream Condition Inventory Report. Unpublished Report. Weaverville Ranger District, Weaverville, CA.
- USDA, Forest Service. 2004. Weaverville Watershed Analysis. Shasta Trinity National Forest, Weaverville Ranger District, Weaverville, CA.
- USFWS (U.S. Fish and Wildlife Service). 1998. “Klamath River (Iron Gate Dam to Seiad Creek) life history periodicities for Chinook, coho, and steelhead.” Unpublished report.
- USFWS and Hoopa Valley Tribe, 1999. Trinity River Flow Evaluation Final Report. Report to the Secretary, U.S. Department of the Interior. Washington D.C. 307 pp.
- Viola, A.E. and M.L. Schuck. 1995. “A method to reduce the abundance of residual hatchery steelhead in rivers.” North American Journal of Fisheries Management. 15: 488-493.
- Waples, R.S. 1991. “Genetic interactions between hatchery and wild salmonids: lessons from the Pacific Northwest.” Canadian Journal of Fisheries and Aquatic Sciences 48(Supplement 1):124-133.

Wemple, B.C. 1994. Hydrologic integration of forest roads with stream networks in two basins, Western Cascades, Oregon. Oregon State Univ. MS thesis.

California Natural Diversity Database (CNDDB) Report

California Natural Diversity Database (CNDDB)

Lewiston and 8 surrounding quads

QUAD NAME	SCIENTIFIC NAME	COMMON NAME	FED STATUS	CAL STATUS	CDFG	CNPS LIST
Bully Choop Mtn.	Accipiter gentilis	Northern goshawk	None	None	SC	
Bully Choop Mtn.	Martes pennanti (pacifica) DPS	Pacific fisher	Candidate	None	SC	
Bully Choop Mtn.	Epilobium siskiyouense	Siskiyou fireweed	None	None		1B.3
French Gulch	Ascapus truei	Western tailed frog	None	None	SC	
French Gulch	Rana boylei	Foothill yellow-legged frog	None	None	SC	
French Gulch	Myotis thysanodes	Fringed myotis	None	None		
French Gulch	Corynorhinus townsendii	Townsend's big-eared bat	None	None	SC	
French Gulch	Antrozous pallidus	Pallid bat	None	None	SC	
French Gulch	Martes pennanti (pacifica) DPS	Pacific fisher	Candidate	None	SC	
French Gulch	Alkali Seep	Alkali seep	None	None		
French Gulch	Puccinellia howellii	Howell's alkali grass	None	None		1B.1
Hoosimbim Mtn.	Harmonia doris-nilesiae	Niles's harmonia	None	None		1B.1
Lewiston	Rana boylei	Foothill yellow-legged frog	None	None	SC	
Lewiston	Haliaeetus leucocephalus	Bald eagle	Threatened	Endangered		
Lewiston	Oncorhynchus tshawytscha spring-run	Spring-run chinook salmon	Threatened	Threatened		
Lewiston	Antrozous pallidus	Pallid bat	None	None	SC	
Lewiston	Martes pennanti (pacifica) DPS	Pacific fisher	Candidate	None	SC	
Lewiston	Emys (=Clemmys) marmorata marmorata	Northwestern pond turtle	None	None	SC	
Lewiston	Carex hystericina	Bottlebrush sedge	None	None		2.1
Lewiston	Carex vulpinoidea	Fox sedge	None	None		2.2
Papoose Creek	Haliaeetus leucocephalus	Bald eagle	Threatened	Endangered		
Papoose Creek	Gulo gulo	California wolverine	None	Threatened		
Papoose Creek	Clarkia borealis ssp. borealis	Northern clarkia	None	None		1B.3
Rush Creek Lakes	Martes americana	American (=pine) marten	None	None		
Rush Creek Lakes	Martes pennanti (pacifica) DPS	Pacific fisher	Candidate	None	SC	
Rush Creek Lakes	Ancotrema voyanum	Hooded lancetooth	None	None		
Rush Creek Lakes	Punctum hannai	Trinity spot	None	None		
Rush Creek Lakes	Lewisia cotyledon var. heckneri	Heckner's lewisia	None	None		1B.2
Rush Creek Lakes	Penstemon filiformis	Thread-leaved beardtongue	None	None		1B.3
Rush Creek Lakes	Juncus regelii	Regel's rush	None	None		2.3
Rush Creek Lakes	Smilax jamesii	English Peak greenbriar	None	None		1B.3
Shasta Bally	Taxidea taxus	American badger	None	None	SC	

Shasta Bally	Northern Interior Cypress Forest	Northern interior cypress rorest	None	None	
Trinity Dam	Haliaeetus leucocephalus	Bald eagle	Threatened	Endangered	
Trinity Dam	Martes pennanti (pacifica) DPS	Pacific fisher	Candidate	None	SC
Trinity Dam	Penstemon filiformis	Thread-leaved beardtongue	None	None	1B.3
Trinity Dam	Carex hystericina	Bottlebrush sedge	None	None	2.1
Trinity Dam	Juncus regelii	Regel's rush	None	None	2.3
Weaverville	Rana boylei	Foothill yellow-legged frog	None	None	SC
Weaverville	Aquila chrysaetos	Golden eagle	None	None	SC
Weaverville	Oncorhynchus tshawytscha spring-run	Spring-run chinook salmon	Threatened	Threatened	
Weaverville	Lepus americanus klamathensis	Oregon snowshoe hare	None	None	SC
Weaverville	Martes pennanti (pacifica) DPS	Pacific fisher	Candidate	None	SC
Weaverville	Emys (=Clemmys) marmorata marmorata	Northwestern pond turtle	None	None	SC
Weaverville	Juncus dudleyi	Dudley's rush	None	None	2.3

CNPS Inventory of Rare and Endangered Plants

Tue, Nov. 21, 2006 11:30 c

Lewiston and 8 surrounding quads

Scientific	Common	Family	CNPS
<i>Carex hystericina</i>	bottlebrush sedge	Cyperaceae	List 2.1
<i>Clarkia borealis</i> ssp. <i>borealis</i>	northern clarkia	Onagraceae	List 1B.3
<i>Epilobium siskiyouense</i>	Siskiyou fireweed	Onagraceae	List 1B.3
<i>Harmonia doris-nilesiae</i>	Niles's harmonia	Asteraceae	List 1B.1
<i>Juncus dudleyi</i>	Dudley's rush	Juncaceae	List 2.3
<i>Juncus regelii</i>	Regel's rush	Juncaceae	List 2.3
<i>Lewisia cotyledon</i> var. <i>heckneri</i>	Heckner's lewisia	Portulacaceae	List 1B.2
<i>Penstemon filiformis</i>	thread-leaved beardtongue	Scrophulariaceae	List 1B.3
<i>Penstemon tracyi</i>	Tracy's beardtongue	Scrophulariaceae	List 1B.3
<i>Puccinellia howellii</i>	Howell's alkali grass	Poaceae	List 1B.1
<i>Smilax jamesii</i>	English Peak greenbriar	Smilacaceae	List 1B.3

ECOLOGICAL REPORT

Scientific	Family	Life form	Blooming	Communities	Elevation	CNPS
Carex hystericina	Cyperaceae	Perennial rhizomatous herb	Jun	•Marshes and swamps (streambanks)	610 - 915 meters	List 2.1
Clarkia borealis ssp. borealis	Onagraceae	Annual	Jun-Sep	•Chaparral •Cismontane woodland •Lower montane coniferous forest	400 - 1340 meters	List 1B.3
Epilobium siskiyouense	Onagraceae	Perennial herb	Jul-Sep	•Alpine boulder and rock field •Subalpine coniferous forest •Upper montane coniferous forest/rocky, serpentinite	1700 - 2500 meters	List 1B.3
Harmonia doris-nilesiae	Asteraceae	Annual herb	May-Jul	•Chaparral •Cismontane woodland •Lower montane coniferous forest/ usually serpentinite, openings rocky	650 - 1660 meters	List 1B.1
Juncus dudleyi	Juncaceae	Perennial herb	Jul-Aug	•Lower montane coniferous forest (mesic)	455 - 2000 meters	List 2.3
Juncus regelii	Juncaceae	Perennial rhizomatous herb	Aug	•Meadows and seeps •Upper montane coniferous forest /mesic	760 - 1900 meters	List 2.3
Lewisia cotyledon var. heckneri	Portulacaceae	Perennial herb	May-Jul	•Lower montane coniferous forest (rocky)	225 - 2100 meters	List 1B.2
Penstemon filiformis	Scrophulariaceae	Perennial herb	May-Jul	•Cismontane woodland •Lower montane coniferous forest /rocky	450 - 1830 meters	List 1B.3
Penstemon tracyi	Scrophulariaceae	Perennial herb	Jun-Aug	•Upper montane coniferous forest (rocky)	1980 - 2145 meters	List 1B.3
Puccinellia howellii	Poaceae	Perennial herb	Apr-Jun	•Meadows and seeps (mineralized)	490 - 490 meters	List 1B.1
Smilax jamesii	Smilacaceae	Perennial rhizomatous herb	May-Jul	•Broadleafed upland forest •Lower montane coniferous forest •Marshes and swamps •North Coast coniferous forest •Upper montane coniferous forest/ streambanks and lake margins	580 - 2500 meters	List 1B.3

Plant Species Observed at the Lewiston Site

Plant Species Observed at the Lewiston Site
Field Visit Dates: April 11-15, May 2-6, and June 20-22, 2005

Botanical Name	Common Name	Family
UPLANDS		
<i>Achillea millefolium</i>	Yarrow	Asteraceae
<i>Agoseris retrorsa</i>	Spear-leaved agoseris	Asteraceae
<i>Agoseris sp</i>	Agoseris	Asteraceae
<i>Allium sp</i>	Onion	Liliaceae
<i>Alnus rhombifolia</i>	White alder	Betulaceae
<i>Ambrosia psilostachya</i>	Western ragweed	Asteraceae
<i>Amsinckia menziesii var intermedia</i>	Fiddleneck	Boraginaceae
<i>Amsinckia menziesii var intermedia</i>	Common fiddleneck	Boraginaceae
<i>Amsinckia menziesii var menziesii</i>	Menzies' fiddle-neck	Boraginaceae
<i>Anthoxanthum aristatum</i>	Annual sweet vernalgrass	Poaceae
<i>Anthoxanthum odoratum</i>	Sweet vernal grass	Poaceae
<i>Anthriscus caucalis</i>	Bur-chervil	Apiaceae
<i>Arabidopsis thaliana</i>	Thalecresss	Brassicaceae
<i>Arbutus menziesii</i>	Madrone	Ericaceae
<i>Arctostaphylos patula</i>	Green-leaved manzanita	Ericaceae
<i>Arctostaphylos viscida</i>	White-leaved manzanita	Ericaceae
<i>Artemisia douglasiana</i>	Mugwort	Asteraceae
<i>Avena barbata</i>	Slender wild oat	Poaceae
<i>Avena fatua</i>	Wild oat	Poaceae
<i>Barbarea verna</i>	Wintercress	Brassicaceae
<i>Berberis aquifolium</i>	Oregon grape holly	Berberidaceae
<i>Brassica nigra</i>	Black mustard	Brassicaceae
<i>Brickellia californica</i>	California Brickellbush	Asteraceae
<i>Bromus carinatus</i>	California brome	Poaceae
<i>Bromus diandrus</i>	Ripgut brome	Poaceae
<i>Bromus madritensis ssp rubens</i>	Red brome	Poaceae
<i>Bromus tectorum</i>	Cheatgrass	Poaceae
<i>Calocedrus decurrens</i>	Incense cedar	Cupressaceae
<i>Calochortus tolmiei</i>	Pussy ears	Liliaceae
<i>Casilleja tenuis</i>	Hairy owl-clover	Scrophulariaceae
<i>Castilleja lacera</i>	Cut-leaved owl-clover	Scrophulariaceae
<i>Ceanothus cordulatus</i>	Mountain whitethorn	Rhamnaceae
<i>Ceanothus cuneatus</i>	Buckbrush	Rhamnaceae
<i>Ceanothus diversifolius</i>	Pinemat	Rhamnaceae
<i>Ceanothus integerrimus</i>	Deerbrush	Rhamnaceae
<i>Ceanothus velutinus</i>	Tobacco-brush	Rhamnaceae
<i>Centaurea solstitialis</i>	Yellow star-thistle	Asteraceae

<i>Cerastium glomeratum</i>	Mouse-eared chickweed	Caryophyllaceae
<i>Cercis occidentalis</i>	Redbud	Fabaceae
<i>Cercocarpus betuloides</i>	Mountain mahogany	Rosaceae
<i>Chamomilla suaveolens</i>	Pineapple weed	Asteraceae
<i>Clarkia sp</i>	Clarkia	Onagraceae
<i>Claytonia exigua ssp glauca</i>	Glaucous miner's-lettuce	Portulacaceae
<i>Claytonia parviflora</i>	Miner's lettuce	Portulacaceae
<i>Clematis ligusticifolia</i>	Virgin's bower	Ranunculaceae
<i>Collinsia greenei</i>	Greene's collinsia	Scrophulariaceae
<i>Collomia linearis</i>	Narrow-leaved collomia	Polemoniaceae
<i>Conium maculatum</i>	Poison hemlock	Apiaceae
<i>Crassula connata</i>	Pigmyweed	Crassulaceae
<i>Crucianella angustifolia</i>	Crosswort	Rubiaceae
<i>Cryptantha sp</i>	Cryptantha	Boraginaceae
<i>Cynoglossum grande</i>	Pacific hound's tongue	Boraginaceae
<i>Cynosurus echinatus</i>	Hedgehog dogtail	Poaceae
<i>Danthonia unispicata</i>	One-spiked oatgrass	Poaceae
<i>Daucus carota</i>	Queen anne's lace	Apiaceae
<i>Dichelostemma capitatum</i>	Bluedicks	Liliaceae
<i>Dichelostemma multiflorum</i>	Round-toothed ookow	Liliaceae
<i>Dodecatheon hendersonii</i>	Henderson's shooting star	Primulaceae
<i>Draba verna</i>	Spring whitlow grass	Brassicaceae
<i>Elymus glaucus</i>	Blue wild rye	Poaceae
<i>Eriodictyon californicum</i>	Yerba-santa	Hydrophyllaceae
<i>Eriogonum nudum</i>	Nude buckwheat	Polygonaceae
<i>Eriophyllum lanatum</i>	Wooly sunflower	Asteraceae
<i>Erodium botrys</i>	Long-beaked stork's bill	Geraniaceae
<i>Erodium cicutarium</i>	Red-stemmed filaree	Geraniaceae
<i>Eschscholzia californica</i>	California poppy	Papaveraceae
<i>Fraxinus latifolia</i>	Oregon ash	Oleaceae
<i>Galium aparine</i>	Cleavers	Rubiaceae
<i>Galium parisense</i>	Wall bedstraw	Rubiaceae
<i>Garrya fremontii</i>	Silk tassel	Garryaceae
<i>Geranium dissectum</i>	Cut-leaved geranium	Geraniaceae
<i>Grindelia hirsutula var davyi</i>	Foothill gumplant	Asteraceae
<i>Hordeum marinum</i>	Mediterranean barley	Poaceae
<i>Horkellia sp</i>	Horkellia	Rosaceae
<i>Hypericum perforatum</i>	Klamathweed	Hypericaceae
<i>Hypochaeris glabra</i>	Smooth cat's ear	Asteraceae
<i>Hypochaeris radiata</i>	Rough cat's ear	Asteraceae
<i>Iris germanica</i>	Common flag	Iridaceae
<i>Lasthenia californica</i>	California goldfields	Asteraceae
<i>Lathyrus latifolia</i>	Perennial sweetpea	Fabaceae
<i>Lepidium campestre</i>	English pepper-grass	Brassicaceae
<i>Lepidium oblongum var oblongum</i>	Wayside peppergrass	Brassicaceae

<i>Linaria genistifolia ssp dalmatica</i>	Dalmatian toadflax	Scrophulariaceae
<i>Lolium perenne</i>	Perennial ryegrass	Poaceae
<i>Lomatium dasycarpum</i>	Hairy-fruited lomatium	Apiaceae
<i>Lonicera interrupta</i>	Chaparral honeysuckle	Caprifoliaceae
<i>Lotus corniculatus</i>	Bird's foot trefoil	Fabaceae
<i>Lotus humistratus</i>	Foothill lotus	Fabaceae
<i>Lotus micranthus</i>	Small-flowered lotus	Fabaceae
<i>Lotus wrangelianus</i>	Wrangle lotus	Fabaceae
<i>Lupinus albifrons var albifrons</i>	Silver bush lupine	Fabaceae
<i>Lupinus bicolor</i>	Bicolored lupine	Fabaceae
<i>Lupinus sp.</i>	Bush lupine	Fabaceae
<i>Medicago lupulina</i>	Black medick	Fabaceae
<i>Medicago sp</i>	bur-clover	Fabaceae
<i>Mimulus auranticus</i>	Bush monkeyflower	Scrophulariaceae
<i>Minuartia douglasii</i>	Douglas' sandwort	Caryophyllaceae
<i>Monardella odoratissima</i>	Pallid monardella	Lamiaceae
<i>Muhlenbergia filiformis</i>	Pull-up muhly	Poaceae
<i>Muhlenbergia microsperma</i>	Little-seeded muhly	Poaceae
<i>Nemophila pedunculata</i>	Meadow nemophila	Hydrophyllaceae
<i>Petrorhagia dubia</i>	Grass-pink	Caryophyllaceae
<i>Phacelia heterophylla ssp virgata</i>	Virgate phacelia	Hydrophyllaceae
<i>Phacelia ramosissima</i>	Branched phacelia	Hydrophyllaceae
<i>Phacelia sp</i>	Phacelia	Hydrophyllaceae
<i>Pinus ponderosa</i>	Ponderosa pine	Pinaceae
<i>Pinus sabiniana</i>	Gray pine	Pinaceae
<i>Plagiobothrys nothofulvus</i>	Popcorn flower	Boraginaceae
<i>Plagiobothrys tenellus</i>	Slender popcorn flower	Boraginaceae
<i>Plantago erecta</i>	Erect plantain	Plantaginaceae
<i>Plantago lanceolata</i>	English plantain	Plantaginaceae
<i>Plectritis ciliosa ssp insignis</i>	Pink plectritis	Valerianaceae
<i>Poa annua</i>	Annual bluegrass	Poaceae
<i>Poa bulbosa</i>	Bulbous bluegrass	Poaceae
<i>Poa cuspidata</i>	Bluegrass	Poaceae
<i>Poa howellii</i>	Howell's bluegrass	Poaceae
<i>Polygonum sp</i>	Knotweed	Polygonaceae
<i>Polystichum munitum</i>	Western sword fern	Dryopteridaceae
<i>Populus balsamifera ssp trichocarpa</i>	Black cottonwood	Salicaceae
<i>Potentilla glandulosa var glandulosa</i>	Sticky cinquefoil	Rosaceae
<i>Prunus subcordata</i>	Sierra plum	Rosaceae
<i>Prunus virginiana</i>	Chokecherry	Rosaceae
<i>Pseudotsuga menziesii</i>	Douglas fir	Pinaceae
<i>Pteridium aquilinum</i>	Western bracken fern	Dennstaedtiaceae
<i>Quercus chrysolepis</i>	Canyon live oak	Fagaceae
<i>Quercus garryana var garryana</i>	Garry oak	Fagaceae
<i>Quercus kelloggii</i>	Black oak	Fagaceae

<i>Quercus wislizeni</i>	Interior live oak	Fagaceae
<i>Ranunculus occidentalis</i>	Western buttercup	Ranunculaceae
<i>Rhus trilobata</i>	Skunkbrush	Anacardiaceae
<i>Ribes roezlii</i>	Sierra gooseberry	Grossulariaceae
<i>Rosa californica</i>	California rose	Rosaceae
<i>Rubus discolor</i>	Himalayan blackberry	Rosaceae
<i>Rumex acetosella</i>	Common sheep-sorrell	Polygonaceae
<i>Rumex crispus</i>	Curly dock	Polygonaceae
<i>Sambucus mexicana</i>	Elderberry	Caprifoliaceae
<i>Sanguisorba occidentalis</i>	Western burnet	Rosaceae
<i>Sanicula crassicaulis</i>	Pacific sanicle	Apiaceae
<i>Saponaria officinalis</i>	Bouncing-bet	Caryophyllaceae
<i>Senecio vulgaris</i>	Old man in the spring	Asteraceae
<i>Stellaria media</i>	Common chickweed	Caryophyllaceae
<i>Symphoricarpos albus</i>	Common snowberry	Caprifoliaceae
<i>Taeniatherum caput-medusae</i>	Medusahead	Poaceae
<i>Thysanocarpus curvipes</i>	Clasping-leaved lacepod	Brassicaceae
<i>Toxicodendron diversilobium</i>	Poison oak	Anacardiaceae
<i>Trifolium albopurpureum</i> var <i>dichotomum</i>	Indian clover	Fabaceae
<i>Trifolium fragiferum</i>	Strawberry clover	Fabaceae
<i>Trifolium hirtum</i>	Rose clover	Fabaceae
<i>Trifolium microcephalum</i>	Small-headed clover	Fabaceae
<i>Trifolium</i> sp	Clover	Fabaceae
<i>Trifolium subterraneum</i>	Subterranean clover	Fabaceae
<i>Trifolium willdenovii</i>	Tomcat clover	Fabaceae
<i>Uropappus lindleyi</i>	Silverpuffs	Asteraceae
<i>Verbascum thapsus</i>	Woolly mullein	Scrophulariaceae
<i>Vicia americana</i>	American vetch	Fabaceae
<i>Vitis californica</i>	California grape	Vitaceae
RIPARIAN AND WETLANDS		
<i>Acer macrophyllum</i>	Big-leaf maple	Aceraceae
<i>Achillea millefolium</i>	Yarrow	Asteraceae
<i>Alnus rhombifolia</i>	White alder	Betulaceae
<i>Amsinckia menziesii</i> var <i>intermedia</i>	Common fiddleneck	Boraginaceae
<i>Amsinckia menziesii</i> var <i>menziesii</i>	Menzies' fiddle-neck	Boraginaceae
<i>Anthoxanthum aristatum</i>	Annual sweet vernal grass	Poaceae
<i>Anthoxanthum odoratum</i>	Sweet vernal grass	Poaceae
<i>Anthriscus caucalis</i>	Bur-chervil	Apiaceae
<i>Arabidopsis thaliana</i>	Thalecress	Brassicaceae
<i>Artemisia douglasiana</i>	Mugwort	Asteraceae
<i>Asclepias speciosa</i>	Milkweed	Asclepiaceae
<i>Avena barbata</i>	Slender wild oat	Poaceae
<i>Barbarea verna</i>	Wintercress	Brassicaceae
<i>Brassica nigra</i>	Black mustard	Brassicaceae

<i>Brickellia californica</i>	California Brickellbush	Asteraceae
<i>Bromus carinatus</i>	California brome	Poaceae
<i>Bromus diandrus</i>	Ripgut brome	Poaceae
<i>Bromus madritensis ssp rubens</i>	Red brome	Poaceae
<i>Bromus tectorum</i>	Cheatgrass	Poaceae
<i>Calandrinia ciliata</i>	Redmaids	Portulacaceae
<i>Cardamine breweri var breweri</i>	Sierra bittercress	Brassicaceae
<i>Cardamine oligosperma</i>	Western bittercress	Brassicaceae
<i>Carex aquitilis</i>	Water sedge	Cyperaceae
<i>Carex barbarae</i>	Santa barbara sedge	Cyperaceae
<i>Carex cusickii</i>	Cusick's sedge	Cyperaceae
<i>Carex echinata</i>	Stellate sedge	Cyperaceae
<i>Carex lanuginosa</i>	Woolly sedge	Cyperaceae
<i>Carex lenticularis</i>	Few-ribbed sedge	Cyperaceae
<i>Carex nudata</i>	Torrent sedge	Cyperaceae
<i>Carex serratodens</i>	Saw-toothed sedge	Cyperaceae
<i>Carex sp</i>	Sedge	Cyperaceae
<i>Centaurea solstitialis</i>	Yellow star-thistle	Asteraceae
<i>Cerastium glomeratum</i>	Mouse-eared chickweed	Caryophyllaceae
<i>Ceratophyllum demersum</i>	Hornwort	Ceratophyllaceae
<i>Cercis occidentalis</i>	Redbud	Fabaceae
<i>Chamomilla suaveolens</i>	Pineapple weed	Asteraceae
<i>Cirsium vulgare</i>	Bull thistle	Asteraceae
<i>Claytonia parviflora</i>	Miner's lettuce	Portulacaceae
<i>Clematis ligusticifolia</i>	Virgin's bower	Ranunculaceae
<i>Conium maculatum</i>	Poison hemlock	Apiaceae
<i>Cornus sericea</i>	Western dogwood	Cornaceae
<i>Cynosurus echinatus</i>	Hegdehog dogtail	Poaceae
<i>Cyperus sp</i>	Nutsedge	Cyperaceae
<i>Daucus carota</i>	Queen anne's lace	Apiaceae
<i>Elymus glaucus</i>	Blue wild rye	Poaceae
<i>Equisetum arvense</i>	Common horsetail	Equisetaceae
<i>Equisetum hymale</i>	Common scouring rush	Equisetaceae
<i>Equisetum laevigatum</i>	Smooth scouring rush	Equisetaceae
<i>Erodium botrys</i>	Cranesbill	Geraniaceae
<i>Erodium botrys</i>	Long-beaked stork's bill	Geraniaceae
<i>Eschscholzia californica</i>	California poppy	Papaveraceae
<i>Fraxinus latifolia</i>	Oregon ash	Oleaceae
<i>Galium aparine</i>	Cleavers	Rubiaceae
<i>Galium parisense</i>	Wall bedstraw	Rubiaceae
<i>Geranium dissectum</i>	Dissected geranium	Geraniaceae
<i>Hordeum marinum</i>	Mediterranean barley	Poaceae
<i>Hypericum perforatum</i>	Klamathweed	Hypericaceae
<i>Hypochaeris glabra</i>	Smooth cat's-ear	Asteraceae
<i>Hypochaeris radiata</i>	Rough cat's ear	Asteraceae

<i>Juncus effusus</i>	Pacific rush	Juncaceae
<i>Juncus ensifolius</i>	Sword-leaved rush	Juncaceae
<i>Juncus sp</i>	Rush	Juncaceae
<i>Juncus tenuis</i>	Slender rush	Juncaceae
<i>Lactuca seriola</i>	Prickly lettuce	Asteraceae
<i>Lathyrus latifolia</i>	Perennial sweetpea	Fabaceae
<i>Lemna sp</i>	Duckweed	Lemnaceae
<i>Lepidium campestre</i>	English pepper-grass	Brassicaceae
<i>Linaria genistifolia ssp dalmatica</i>	Dalmatian toadflax	Scrophulariaceae
<i>Lolium perenne</i>	Perennial ryegrass	Poaceae
<i>Lotus corniculatus</i>	Bird's foot trefoil	Fabaceae
<i>Lotus micranthus</i>	Small-flowered lotus	Fabaceae
<i>Lotus sp.</i>	Lotus	Fabaceae
<i>Lotus wrangelianus</i>	Wrangle lotus	Fabaceae
<i>Lupinus albifrons var albifrons</i>	Silver bush lupine	Fabaceae
<i>Lupinus bicolor</i>	Bi-colored lupine	Fabaceae
<i>Luzula comosa</i>	Common wood-rush	Juncaceae
<i>Malus domestica</i>	Apple	Rosaceae
<i>Medicago lupulina</i>	Black medick	Fabaceae
<i>Medicago sp</i>	bur-clover	Fabaceae
<i>Mimulus guttatus</i>	Seep monkeyflower	Scrophulariaceae
<i>Muhlenbergia filiformis</i>	Pull-up muhly	Poaceae
<i>Muhlenbergia microsperma</i>	Little-seeded muhly	Poaceae
<i>Muhlenbergia rigens</i>	Deergrass	Poaceae
<i>Nemophila pedunculata</i>	Meadow nemophila	Hydrophyllaceae
<i>Panicum acuminatum var acuminatum</i>	Western panicgrass	Poaceae
<i>Petrorhagia dubia</i>	Grass-pink	Caryophyllaceae
<i>Phacelia heterophylla ssp virgata</i>	Virgate phacelia	Hydrophyllaceae
<i>Phalaris sp</i>	Reed grass	Poaceae
<i>Pinus ponderosa</i>	Ponderosa pine	Pinaceae
<i>Pinus sabiniana</i>	Gray pine	Pinaceae
<i>Plantago lanceolata</i>	English plantain	Plantaginaceae
<i>Plantago major</i>	Common plantain	Plantaginaceae
<i>Poa annua</i>	Annual bluegrass	Poaceae
<i>Poa bulbosa</i>	Bulbous bluegrass	Poaceae
<i>Poa cusickii</i>	Bluegrass	Poaceae
<i>Poa pratensis</i>	Kenyucky bluegrass	Poaceae
<i>Polygonum sp</i>	Knotweed	Polygonaceae
<i>Polystichum imbricans</i>	Narrow-leaved sword	Dryopteridaceae
<i>Populus balsamifera ssp trichocarpa</i>	Black cottonwood	Salicaceae
<i>Potamogeton sp.</i>	Pondweed	Potamogetonaceae
<i>Potentilla glandulosa var glandulosa</i>	Sticky cinquefoil	Rosaceae
<i>Prunus virginiana</i>	Chokecherry	Rosaceae
<i>Pseudotsuga menziesii</i>	Douglas fir	Pinaceae
<i>Pteridium aquilinum</i>	Western bracken fern	Dennstaedtiaceae

<i>Quercus chrysolepis</i>	Canyon live oak	Fagaceae
<i>Quercus garryana</i> var <i>garryana</i>	Garry oak	Fagaceae
<i>Quercus kelloggii</i>	Black oak	Fagaceae
<i>Quercus wislizeni</i>	Interior live oak	Fagaceae
<i>Ranunculus occidentalis</i>	Western buttercup	Ranunculaceae
<i>Rhus trilobata</i>	Skunkbrush	Anacardiaceae
<i>Ribes inerme</i>	Gooseberry	Grossulariaceae
<i>Ribes inerme</i> var <i>klamathense</i>	Klamath gosseberry	Grossulariaceae
<i>Ribes lacustre</i>	Swamp currant	Grossulariaceae
<i>Ribes</i> sp	Gooseberry	Grossulariaceae
<i>Rosa californica</i>	California rose	Rosaceae
<i>Rubus discolor</i>	Himalayan blackberry	Rosaceae
<i>Rubus pensilvanicus</i>	Pennsylvania blackberry	Rosaceae
<i>Rubus ursinus</i>	California blackberry	Rosaceae
<i>Rumex acetosella</i>	Common sheep-sorrell	Polygonaceae
<i>Rumex crispus</i>	Curly dock	Polygonaceae
<i>Rumex salicifolius</i>	Willow-leaved dock	Polygonaceae
<i>Salix exigua</i>	Sandbar willow	Salicaceae
<i>Salix lasiolepis</i>	Arroyo willow	Salicaceae
<i>Salix lucida</i> ssp <i>lasiandra</i>	Shining willow	Salicaceae
<i>Salix melanopsis</i>	Dusky willow	Salicaceae
<i>Sambucus mexicana</i>	Elderberry	Caprifoliaceae
<i>Sanguisorba occidentalis</i>	Western burnet	Rosaceae
<i>Sanicula crassicaulis</i>	Pacific sanicle	Apiaceae
<i>Saponaria officinalis</i>	Bouncing-bet	Caryophyllaceae
<i>Scirpus</i> sp.	Bull rush	Cyperaceae
<i>Spiraea douglasii</i>	Douglas' spiraea	Rosaceae
<i>Stachys ajugoides</i> var <i>rigida</i>	Rigid hedge nettle	Lamiaceae
<i>Stellaria media</i>	Chickweed	Caryophyllaceae
<i>Stellaria media</i>	Commonm chickweed	Caryophyllaceae
<i>Stellaria media</i>	Chickweed	Caryophyllaceae
<i>Symphoricarpos albus</i>	Common snowberry	Caprifoliaceae
<i>Taraxacum officinale</i>	Dandelion	Asteraceae
<i>Thysanocarpus curvipes</i>	Clasping-leaved lacepod	Brassicaceae
<i>Toxicodendron diversilobium</i>	Poison oak	Anacardiaceae
<i>Trifolium hirtum</i>	Rose clover	Fabaceae
<i>Trifolium microcephalum</i>	Small-headed clover	Fabaceae
<i>Trifolium repens</i>	White clover	Fabaceae
<i>Typha latifolia</i>	Broad-leaved cattail	Typhaceae
<i>Uropappus lindleyi</i>	Silverpuffs	Asteraceae
<i>Verbascum blattaria</i>	Moth mullein	Scrophulariaceae
<i>Verbascum thapsus</i>	Woolly mullien	Scrophulariaceae
<i>Vicia americana</i>	American vetch	Fabaceae
<i>Vitis californica</i>	California grape	Vitaceae
<i>Xanthium strumarium</i>	Cocklebur	Asteraceae

Plant Species Observed at the Dark Gulch Site
Field Visit Dates: April 11-15, May 2-6, and June 20-22, 2005

Botanical Name	Common Name	Family
UPLAND		
<i>Achillea millefolium</i>	Yarrow	Asteraceae
<i>Agoseris heterophylla</i>	Annual agoseris	Asteraceae
<i>Amsinckia menziesii</i> var <i>intermedia</i>	Common fiddleneck	Boraginaceae
<i>Amsinckia menziesii</i> var <i>menziesii</i>	Fiddleneck	Boraginaceae
<i>Antennaria argentea</i>	Silvery pussytoes	Asteraceae
<i>Anthriscus caucalis</i>	Bur-chervil	Apiaceae
<i>Arbutus menziesii</i>	Madrone	Ericaceae
<i>Arctostaphylos manzanita</i>	Manzanita	Ericaceae
<i>Arctostaphylos patula</i>	Green-leaved manzanita	Ericaceae
<i>Arctostaphylos viscida</i>	White-leaved manzanita	Ericaceae
<i>Artemisia douglasiana</i>	Mugwort	Asteraceae
<i>Asclepias speciosa</i>	Milkweed	Asclepiaceae
<i>Avena barbata</i>	Slender wild oat	Poaceae
<i>Avena fatua</i>	Wild oat	Poaceae
<i>Brickellia californica</i>	California brickellbush	Asteraceae
<i>Briza minor</i>	Lesser quaking-grass	Poaceae
<i>Brodiaea californica</i>	California brodiaea	Liliaceae
<i>Bromus carinatus</i>	California brome	Poaceae
<i>Bromus diandrus</i>	Ripgut brome	Poaceae
<i>Bromus hordeaceus</i>	Soft chess	Poaceae
<i>Bromus madritensis</i> ssp <i>rubens</i>	Red brome	Poaceae
<i>Bromus tectorum</i>	Cheatgrass	Poaceae
<i>Calocedrus decurrens</i>	Incense cedar	Cupressaceae
<i>Calochortus tomeliei</i>	Pussy-ears	Liliaceae
<i>Calystegia</i> sp	Morning glory	Convolvulaceae
<i>Camissonia contorta</i>	Twisted evening-primrose	Onagraceae
<i>Carex geyeri</i>	Geyer's sedge	Cyperaceae
<i>Carex multicaulis</i>	Many-stemmed sedge	Cyperaceae
<i>Casilleja tenuis</i>	Hairy owl-clover	Scrophulariaceae
<i>Castilleja lacera</i>	Cut-leaved owl-clover	Scrophulariaceae
<i>Ceanothus cordulatus</i>	Mountain whitethorn	Rhamnaceae
<i>Ceanothus cuneatus</i>	Buckbrush	Rhamnaceae
<i>Ceanothus diversifolius</i>	Pinemat	Rhamnaceae
<i>Ceanothus integerrimus</i>	Deerbrush	Rhamnaceae
<i>Ceanothus velutinus</i>	Tobacco-brush	Rhamnaceae
<i>Centaurea solstitialis</i>	Yellow star-thistle	Asteraceae
<i>Cercocarpus betuloides</i>	Mountain mahogany	Rosaceae
<i>Chamomilla suaveolens</i>	Pineapple weed	Asteraceae

<i>Cirsium occidentale</i> var <i>candidissimum</i>	Snowy thistle	Asteraceae
<i>Cirsium vulgare</i>	Bull thistle	Asteraceae
<i>Clarkia</i> sp	Clarkia	Onagraceae
<i>Claytonia parviflora</i>	Miner's lettuce	Portulacaceae
<i>Claytonia perfoliata</i>	Miner's lettuce	Portulacaceae
<i>Claytonia rubra</i> var <i>rubra</i>	Red-stemmed miner's lettuce	Portulacaceae
<i>Clematis ligusticifolia</i>	Virgin's bower	Ranunculaceae
<i>Collinsia sparsiflora</i> var <i>collina</i>	Foothill collinsia	Scrophulariaceae
<i>Collomia heterophylla</i>	Variable-leaved collomia	Polemoniaceae
<i>Comandra umbellata</i> ssp <i>californica</i>	Bastard toad-flax	Santalaceae
<i>Conium maculatum</i>	Poison hemlock	Apiaceae
<i>Convolvulus arvensis</i>	Bindweed	Convolvulaceae
<i>Crassula connata</i>	Pigmyweed	Crassulaceae
<i>Cynosurus echinatus</i>	Hegdehog dogtail	Poaceae
<i>Cyperus</i> sp	Nutsedge	Cyperaceae
<i>Cystopteris fragilis</i>	Fragile fern	Dryopteridaceae
<i>Danthonia unispicata</i>	One-spiked oatgrass	Poaceae
<i>Daucus carota</i>	Queen anne's lace	Apiaceae
<i>Dichelostemma capitatum</i>	Bluedicks	Liliaceae
<i>Dichelostemma congestum</i>	Fork-toothed ookow	Liliaceae
<i>Elymus glaucus</i>	Blue wild rye	Poaceae
<i>Epilobium minutum</i>	Minute willowherb	Onagraceae
<i>Eriodictyon californicum</i>	Yerba-santa	Hydrophyllaceae
<i>Eriogonum nudum</i>	Nude buckwheat	Polygonaceae
<i>Eriophyllum lanatum</i>	Woolly sunflower	Asteraceae
<i>Erodium botrys</i>	Long-beaked stork's bill	Geraniaceae
<i>Erodium cicutarium</i>	Red-stemmed filaree	Geraniaceae
<i>Eschscholzia californica</i>	California poppy	Papaveraceae
<i>Fraxinus latifolia</i>	Oregon ash	Oleaceae
<i>Galium aparine</i>	Cleavers	Rubiaceae
<i>Galium boreale</i>	Northern bedstraw	Rubiaceae
<i>Garrya fremontii</i>	Silk tassel	Garryaceae
<i>Gillia</i> sp	gillia	Polemoniaceae
<i>Grindelia hirsutula</i> var <i>davyi</i>	Foothill gumplant	Asteraceae
<i>Hordeum marinum</i>	Mediterranean barley	Poaceae
<i>Hypericum perforatum</i>	Klamathweed	Hypericaceae
<i>Hypochaeris glabra</i>	Smooth cat's-ear	Asteraceae
<i>Hypochaeris radicata</i>	Rough cat's-ear	Asteraceae
<i>Juncus bufonius</i>	Toad rush	Juncaceae
<i>Juncus capitatus</i>	Leafy-bracted dwarf rush	Juncaceae
<i>Juncus ensifolius</i>	Sword-leaved rush	Juncaceae
<i>Lactuca seriola</i>	Prickly lettuce	Asteraceae
<i>Lathyrus latifolia</i>	Perennial sweetpea	Fabaceae
<i>Leucantheum vulgare</i>	Ox-eye daisy	Asteraceae

<i>Linanthus bolanderi</i>	Bolander's linanthus	Polemoniaceae
<i>Linaria genistifolia</i> ssp <i>dalmatica</i>	Dalmatian toadflax	Scrophulariaceae
<i>Lolium multiflorum</i>	Annual ryegrass	Poaceae
<i>Lomatium dasycarpum</i>	Hairy-fruited lomatium	Apiaceae
<i>Lomatium marginatum</i> var <i>marginatum</i>	Margined lomatium	Apiaceae
<i>Lonicera</i> sp	Honeysuckle	Caprifoliaceae
<i>Lotus corniculatus</i>	Bird's foot trefoil	Fabaceae
<i>Lotus denticulatus</i>	Toothed lotus	Fabaceae
<i>Lotus humistratus</i>	Foothill lotus	Fabaceae
<i>Lotus wrangelianus</i>	Wrangle lotus	Fabaceae
<i>Lupinus albifrons</i> var <i>albifrons</i>	Silver bush lupine	Fabaceae
<i>Lupinus bicolor</i>	Bicolored lupine	Fabaceae
<i>Lupinus lepidus</i>	Graceful lupine	Fabaceae
<i>Lupinus microcarpus</i>	Lupine	Fabaceae
<i>Luzula comosa</i>	Common wood-rush	Juncaceae
<i>Luzula parviflora</i>	Small-flowered wood-rush	Poaceae
<i>Madia elegans</i>	Common madia	Asteraceae
<i>Medicago</i> sp	bur-clover	Fabaceae
<i>Mentha pulegium</i>	Pennyroyal	Lamiaceae
<i>Monardella odoratissima</i>	Pallid monardella	Lamiaceae
<i>Muhlenbergia microsperma</i>	Little-seeded muhly	Poaceae
<i>Myosotis discolor</i>	Yellow scorpion grass	Boraginaceae
<i>Pellaea brachyptera</i>	Sierra cliffbrake	Pteridaceae
<i>Pellaea mucronata</i> var <i>californica</i>	California bird's-foot fern	Pteridaceae
<i>Penstemon</i> sp	Beard-tongue	Scrophulariaceae
<i>Pentagramma triangularis</i> ssp <i>triangularis</i>	Gold-backed fern	Pteridaceae
<i>Petrorhagia dubia</i>	Grass-pink	Caryophyllaceae
<i>Petrorhagia dubia</i>	Grass-pink	Caryophyllaceae
<i>Phacelia egea</i>	Rock phacelia	Hydrophyllaceae
<i>Phacelia heterophylla</i> ssp <i>virgata</i>	Virgate phacelia	Hydrophyllaceae
<i>Pinus ponderosa</i>	Ponderosa pine	Pinaceae
<i>Pinus sabiniana</i>	Gray pine	Pinaceae
<i>Piperia</i> sp	Piperia	Orchidaceae
<i>Plagiobothrys fulvus</i>	Popcorn flower	Boraginaceae
<i>Plagiobothrys humistratus</i>	Popcorn flower	Boraginaceae
<i>Plagiobothrys nothofulvus</i>	Popcorn flower	Boraginaceae
<i>Plagiobothrys stipitatus</i>	Popcorn flower	Boraginaceae
<i>Plantago elongata</i>	Elongate plantain	Plantaginaceae
<i>Plantago erecta</i>	Erect plantain	Plantaginaceae
<i>Plantago lanceolata</i>	English plantain	Plantaginaceae
<i>Plectritis ciliosa</i> ssp <i>insignis</i>	Pink plectritis	Valerianaceae
<i>Poa annua</i>	Annual bluegrass	Poaceae
<i>Poa bulbosa</i>	Bulbous bluegrass	Poaceae
<i>Poa howellii</i>	Howell's bluegrass	Poaceae
<i>Polystichum lonchitis</i>	Holly fern	Dryopteridaceae

<i>Polystichum munitum</i>	Western sword fern	Dryopteridaceae
<i>Prunus subcodata</i>	Sierra plum	Rosaceae
<i>Prunus virginiana</i>	Chokecherry	Rosaceae
<i>Pseudotsuga menziesii</i>	Douglas fir	Pinaceae
<i>Quercus chrysolepis</i>	Canyon live oak	Fagaceae
<i>Quercus garryana</i> var <i>garryana</i>	Garry oak	Fagaceae
<i>Quercus kelloggii</i>	Black oak	Fagaceae
<i>Quercus wislizeni</i>	Interior live oak	Fagaceae
<i>Rhus trilobata</i>	Skunkbrush	Anacardiaceae
<i>Rosa californica</i>	California rose	Rosaceae
<i>Rubus discolor</i>	Himalayan blackberry	Rosaceae
<i>Sambucus mexicana</i>	Elderberry	Caprifoliaceae
<i>Sanguisorba occidentalis</i>	Western burnet	Rosaceae
<i>Sanicula bipinnatifida</i>	Purple sanicle	Apiaceae
<i>Saponaria officinalis</i>	Bouncing-bet	Caryophyllaceae
<i>Silene gallica</i>	Windmill pink	Caryophyllaceae
<i>Smilax californica</i>	California greenbrier	Lilaceae
<i>Symphoricarpos albus</i>	Common snowberry	Caprifoliaceae
<i>Taeniatherum caput-medusae</i>	Medusahead	Poaceae
<i>Thysanocarpus curvipes</i>	Clasping-leaved lacepod	Brassicaceae
<i>Toxicodendron diversilobium</i>	Poison oak	Anacardiaceae
<i>Trifolium albopurpureum</i> var <i>dichotomum</i>	Indian clover	Fabaceae
<i>Trifolium campestre</i>	Hop clover	Fabaceae
<i>Trifolium microcephalum</i>	Small-headed clover	Fabaceae
<i>Trifolium willdenovii</i>	Tomcat clover	Fabaceae
<i>Uropappus lindleyi</i>	Silverpuffs	Asteraceae
<i>Verbascum thapsus</i>	Woolly mullein	Schrophulariaceae
<i>Verbena lasiostachys</i>	Western vervain	Verbenaceae
<i>Vicia americana</i>	American vetch	Fabaceae
<i>Viola purpurea</i> ssp <i>quercetorum</i>	Oakwoods violet	Violaceae
<i>Vitis californica</i>	California grape	Vitaceae
<i>Xanthium strumarium</i>	Cocklebur	Asteraceae
RIPARIAN AND WETLAND		
<i>Achillea millefolium</i>	Yarrow	Asteraceae
<i>Alnus rhombifolia</i>	White alder	Betulaceae
<i>Ambrosia</i> sp	Ragweed	Asteraceae
<i>Amsinckia menziesii</i> var <i>intermedia</i>	Common fiddleneck	Boraginaceae
<i>Amsinckia menziesii</i> var <i>menziesii</i>	Fiddleneck	Boraginaceae
<i>Anthoxanthum aristatum</i>	Annual sweet vernalgrass	Poaceae
<i>Anthriscus caucalis</i>	Bur-chervil	Apiaceae
<i>Apocynum cannabinum</i>	Indian hemp	Apocynaceae
<i>Arabidopsis thaliana</i>	Thalecresss	Brassicaceae
<i>Arbutus menziesii</i>	Madrone	Ericaceae
<i>Artemisia douglasiana</i>	Mugwort	Asteraceae

<i>Asclepias fascicularis</i>	Narrow-leaved milkweed	Asclepiaceae
<i>Asclepias speciosa</i>	Milkweed	Asclepiaceae
<i>Asparagus officinalis</i>	Asparagus	Lilaceae
<i>Avena barbata</i>	Slender wild oat	Poaceae
<i>Avena fatua</i>	Wild oat	Poaceae
<i>Barbarea verna</i>	Wintercress	Brassicaceae
<i>Brassica nigra</i>	Black mustard	Brassicaceae
<i>Brassica rapa</i>	Field mustard	Brassicaceae
<i>Brickellia californica</i>	California brickellbush	Asteraceae
<i>Bromus carinatus</i>	California brome	Poaceae
<i>Bromus diandrus</i>	Ripgut brome	Poaceae
<i>Bromus madritensis ssp rubens</i>	Red brome	Poaceae
<i>Bromus tectorum</i>	Cheatgrass	Poaceae
<i>Calocedrus decurrens</i>	Incense cedar	Cupressaceae
<i>Cardamine oligosperma</i>	Western bittercress	Brassicaceae
<i>Cardamine pensylvanica</i>	Pennsylvania bittercress	Brassicaceae
<i>Carex barbarae</i>	Santa barbara sedge	Cyperaceae
<i>Carex integra</i>	Smooyh-beaked sedge	Cyperaceae
<i>Carex lanuginosa</i>	Wooly sedge	Cyperaceae
<i>Carex nudata</i>	Torrent sedge	Cyperaceae
<i>Carex senta</i>	Western rough sedge	Cyperaceae
<i>Centaurea solstitialis</i>	Yellow star-thistle	Asteraceae
<i>Cercis occidentalis</i>	Redbud	Fabaceae
<i>Chamomilla suaveolens</i>	Pineapple weed	Asteraceae
<i>Cirsium vulgare</i>	Bull thistle	Asteraceae
<i>Claytonia parviflora ssp parviflora</i>	Miner's lettuce	Portulacaceae
<i>Claytonia perfoliata</i>	Miner's lettuce	Portulacaceae
<i>Claytonia rubra var rubra</i>	Red-stemmed miner's lettuce	Portulacaceae
<i>Clematis ligusticifolia</i>	Virgin's bower	Ranunculaceae
<i>Conium maculatum</i>	Poison hemlock	Apiaceae
<i>Conium maculatum</i>	Poison hemlock	Apiaceae
<i>Convolvulus arvensis</i>	Bindweed	Convolvulaceae
<i>Cornus glabrata</i>	Brown dogwood	Cornaceae
<i>Cynodon dactylon</i>	Bermuda grass	Poaceae
<i>Cynosurus echinatus</i>	Hegdehog dogtail	Poaceae
<i>Cyperus eragrostis</i>	Tall cyperus	Cyperaceae
<i>Cyperus niger</i>	Black cyperus	Cyperaceae
<i>Daucus carota</i>	Queen anne's lace	Apiaceae
<i>Digitaria sanguinalis</i>	Hairy crabgrass	Poaceae
<i>Eleocharis macrostachya</i>	Pale spike-rush	Cyperaceae
<i>Eleocharis obtusa var engelmannii</i>	Spike rush	Cyperaceae
<i>Elymus glaucus</i>	Blue wild rye	Poaceae
<i>Epilobium densiflorum</i>	Dense-flowered spike-primrose	Onagraceae

<i>Equisetum arvense</i>	Common horsetail	Equisetaceae
<i>Equisetum hymale</i>	Common scouring rush	Equisetaceae
<i>Equisetum laevigatum</i>	Smooth scouring rush	Equisetaceae
<i>Eriogonum nudum</i>	Nude buckwheat	Polygonaceae
<i>Eriophyllum lanatum</i>	Woolly sunflower	Asteraceae
<i>Erodium cicutarium</i>	Red-stemmed filaree	Geraniaceae
<i>Eschscholzia californica</i>	California poppy	Papaveraceae
<i>Fraxinus latifolia</i>	Oregon ash	Oleaceae
<i>Galium aparine</i>	Cleavers	Rubiaceae
<i>Geranium dissectum</i>	Dissected-leaf geranium	Geraniaceae
<i>Gnaphalium luteo-album</i>	Cudweed	Asteraceae
<i>Hypericum perforatum</i>	Klamathweed	Hypericaceae
<i>Hypochaeris glabra</i>	Smooth cat's-ear	Asteraceae
<i>Hypochaeris radicata</i>	Rough cat's-ear	Asteraceae
<i>Juncus balticus</i> var <i>balticus</i>	Baltic rush	Juncaceae
<i>Juncus bufonius</i>	Toad rush	Juncaceae
<i>Juncus capitatus</i>	Leafy-bracted dwarf rush	Juncaceae
<i>Juncus effusus</i>	Pacific rush	Juncaceae
<i>Juncus ensifolius</i>	Sword-leaved rush	Juncaceae
<i>Juncus tenuis</i>	Slender rush	Juncaceae
<i>Lactuca seriola</i>	Prickly lettuce	Asteraceae
<i>Lathyrus latifolia</i>	Perennial sweetpea	Fabaceae
<i>Lepidium campestre</i>	English pepper-grass	Brassicaceae
<i>Leucanthemum vulgare</i>	Ox-eye daisy	Asteraceae
<i>Linaria genistifolia</i> ssp <i>dalmatica</i>	Dalmatian toadflax	Scrophulariaceae
<i>Lolium multiflorum</i>	Annual ryegrass	Poaceae
<i>Lolium perenne</i>	Perennial ryegrass	Poaceae
<i>Lonicera</i> sp	Honeysuckle	Caprifoliaceae
<i>Lotus corniculatus</i>	Bird's foot trefoil	Fabaceae
<i>Lupinus albus</i> var <i>albus</i>	Silver bush lupine	Fabaceae
<i>Lupinus bicolor</i>	Bicolored lupine	Fabaceae
<i>Lupinus micropus</i>	Lupine	Fabaceae
<i>Luzula parviflora</i>	Small-flowered wood-rush	Poaceae
<i>Medicago</i> sp	bur-clover	Fabaceae
<i>Mentha pulegium</i>	Pennyroyal	Lamiaceae
<i>Muhlenbergia microspora</i>	Little-seeded muhly	Poaceae
<i>Muhlenbergia rigens</i>	Deergrass	Poaceae
<i>Petrorhagia dubia</i>	Grass-pink	Caryophyllaceae
<i>Phacelia heterophylla</i> ssp <i>virgata</i>	Virgate phacelia	Hydrophyllaceae
<i>Phalaris</i> sp	Reed grass	Poaceae
<i>Pinus ponderosa</i>	Ponderosa pine	Pinaceae
<i>Pinus sabiniana</i>	Gray pine	Pinaceae
<i>Plagiobothrys glyptocarpus</i>	Sculptured popcorn flower	Boraginaceae
<i>Plagiobothrys nothofulvus</i>	Popcorn flower	Boraginaceae
<i>Plagiobotrys stipitatus</i>	Popcorn flower	Boraginaceae

<i>Plantago elongata</i>	Elongate plantain	Plantaginaceae
<i>Plantago erecta</i>	Erect plantain	Plantaginaceae
<i>Plantago lanceolata</i>	English plantain	Plantaginaceae
<i>Plectritis ciliosa ssp insignis</i>	Pink plectritis	Valerianaceae
<i>Poa annua</i>	Annual bluegrass	Poaceae
<i>Poa bulbosa</i>	Bulbous bluegrass	Poaceae
<i>Poa howellii</i>	Howell's bluegrass	Poaceae
<i>Poa pratensis</i>	Kentucky bluegrass	Poaceae
<i>Populus balsamifera ssp trichocarpa</i>	Black cottonwood	Salicaceae
<i>Potamogeton sp</i>	Pondweed	Potamongetonaceae
<i>Potentilla drummondii</i>	Cinquefoil	Rosaceae
<i>Prunus subcodata</i>	Sierra plum	Rosaceae
<i>Prunus virginiana</i>	Chokecherry	Rosaceae
<i>Pseudotsuga menziesii</i>	Douglas fir	Pinaceae
<i>Pseudotsuga menziesii</i>	Douglas fir	Pinaceae
<i>Quercus chrysolepis</i>	Canyon live oak	Fagaceae
<i>Quercus garryana var garryana</i>	Garry oak	Fagaceae
<i>Quercus kelloggii</i>	Black oak	Fagaceae
<i>Quercus wislizeni</i>	Interior live oak	Fagaceae
<i>Ranunculus occidentalis</i>	Western buttercup	Ranunculaceae
<i>Rhus trilobata</i>	Skunkbrush	Anacardiaceae
<i>Ribes inerme var klamathense</i>	Klamath gosseberry	Grossulariaceae
<i>Ribes lacustre</i>	Swamp currant	Grossulariaceae
<i>Rosa californica</i>	California rose	Rosaceae
<i>Rubus discolor</i>	Himalayan blackberry	Rosaceae
<i>Rubus pensilvanicus</i>	Pennsylvania blackberry	Rosaceae
<i>Rubus ursinus</i>	California blackberry	Rosaceae
<i>Rumex acetosella</i>	Common sheep-sorrell	Polygonaceae
<i>Rumex crispus</i>	Curly dock	Polygonaceae
<i>Rumex salicifolius</i>	Willow-leaved dock	Polygonaceae
<i>Salix exigua</i>	Sandbar willow	Salicaceae
<i>Salix lasiolepis</i>	Arroyo willow	Salicaceae
<i>Salix lucida ssp lasiandra</i>	Shining willow	Salicaceae
<i>Salix melanopsis</i>	Dusky willow	Salicaceae
<i>Sambucus mexicana</i>	Elderberry	Caprifoliaceae
<i>Sanguisorba occidentalis</i>	Western burnet	Rosaceae
<i>Saponaria officinalis</i>	Bouncing-bet	Caryophyllaceae
<i>Scirpus sp.</i>	Bull rush	Cyperaceae
<i>Smilax californica</i>	California greenbrier	Lilaceae
<i>Spartium junceum</i>	Spanish broom	Fabaceae
<i>Stachys ajugoides</i>	Rigid hedge-nettle	Lamiaceae
<i>Stellaria media</i>	Chickweed	Caryophyllaceae
<i>Symphoricarpos albus</i>	Common snowberry	Caprifoliaceae
<i>Taraxacum officinale</i>	Dandelion	Asteraceae
<i>Thysanocarpus curvipes</i>	Clasping-leaved lacepod	Brassicaceae

<i>Toxicodendron diversilobium</i>	Poison oak	Anacardiaceae
<i>Trifolium microcephalum</i>	Small-headed clover	Fabaceae
<i>Trifolium repens</i>	White clover	Fabaceae
<i>Typha latifolia</i>	Broad-leaved cattail	Typhaceae
<i>Verbascum thapsus</i>	Woolly mullein	Schrophulariaceae
<i>Verbena lasiostachys</i>	Western vervain	Verbenaceae
<i>Vicia americana</i>	American vetch	Fabaceae
<i>Vitis californica</i>	California grape	Vitaceae
<i>Xanthium strumarium</i>	Cocklebur	Asteraceae

Species Accounts, Special-Status Species

Species Accounts, Special-Status Species

Federally or State-Listed Species

American Peregrine Falcon (*Falco peregrinus anatum*). **Federal status: Delisted; State status: Endangered, Fully Protected.** The peregrine falcon is known as one of the fastest flying birds of prey, preying almost entirely on birds that they kill while in flight. These falcons nest primarily on high cliffs. However, they will also use human-made structures for nesting and occasionally tree cavities or the old nests of other raptors. Intensive efforts to protect peregrine falcons were initiated by biologists from the Santa Cruz Predatory Bird Research Group in 1975. These efforts led to over 120 pairs of peregrine falcons by 1992 (Thelander and Crabtree 1994). The USFWS removed the American peregrine falcon from the endangered species list in 1999, but the State of California has yet to do so.

In California, American peregrine falcons are known to nest along the coast north of Santa Barbara, the northern Coast and Cascade ranges, and the Sierra Nevada. During winter and periods of migration, they can be found throughout most of the state. However, they are most likely to be encountered near wetland or aquatic habitats. The sites lack nesting habitat for this species, however they may occur as foragers.

Bald Eagle (*Haliaeetus leucocephalus*). **Federal status: Delisted; State status: Endangered.** The bald eagle is a large soaring bird, second in size only to the California condor (*Gymnogyps californianus*) in North America. Most of the annual food requirements of a bald eagle is derived from or obtained around aquatic habitats. The type of food consumed most often consists of fish, water birds, and small to medium-sized mammals. Because of the dietary association, nesting territories are usually found near water. Perches are used primarily during the day for resting, preening, and hunting, and may include human-made structures such as power poles. Roosting areas contain a night communal roosting tree that is easily accessible to the large birds and tall enough to provide safety from threats from the ground. Bald eagle nests and roosts are usually found where human activity is infrequent and/or muted.

In California, breeding bald eagles are found mostly in Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity counties (California Department of Fish and Game 2002). Bald eagles are not expected to nest

at the sites due to the level of human disturbance and lack of dense, large trees. However, they may forage in the area.

Little Willow Flycatcher (*Empidonax traillii brewsteri*). **Federal status: None; State status: Endangered.** The little willow flycatcher is one of five subspecies of the willow flycatcher. It breeds in California from Tulare County north, along the western side of the Sierra Nevada and Cascades, extending to the coast in northern California (Craig and Williams 1998). In California, the little willow flycatcher it is a rare to locally uncommon summer resident in wet meadows and montane riparian habitats from 2,000-8,000 feet in elevation and a common spring and fall migrant at lower elevations, primarily in riparian habitats, throughout the state exclusive of the North coast (Zeiner et al. 1990b). This subspecies nests in dense riparian thickets and forages on insects, berries, and seeds. Suitable montane riparian habitat for the little willow flycatcher is present within the sites.

Pacific Fisher (*Martes pennanti pacifica*). **Federal status: Candidate; State status: Species of Special Concern.** In California, fishers primarily inhabit mixed conifer forests composed of Douglas-fir and associated conifers, although they also are encountered frequently in higher elevation, fir and pine forests, and mixed evergreen/broad leaf forest. Fishers den in cavities near the tops of large trees, in hollow logs, and in crevices in rock outcrops and talus. Fishers are not expected to breed on the site but it may use the Trinity River as a travel corridor. The species has been recorded within 5 miles of the project area (California Department of Fish and Game 2003).

Other Special-Status Species

Foothill yellow-legged frog (*Rana boylei*). **Federal status: None; State status: Species of Special Concern.** The foothill yellow-legged frog is found in or near rocky streams in a variety of habitats, including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and wet meadow types. Adults often bask on exposed rock surfaces near streams. During periods of inactivity, especially during cold weather, individuals seek cover under rocks in the streams or on shore within a few meters of water. Unlike most other ranid frogs in California, this species is rarely encountered (even on rainy nights) far from permanent water. Tadpoles require water for at least three or four months while completing their aquatic development.

The species occurs in the Coast Ranges from the Oregon border south to the Transverse Mountains, in most of northern California west of the Cascade

crest, and along the western flank of the Sierra south to Kern County. The riverine and riparian communities provide suitable habitat for the foothill yellow-legged frog. The species is known to occur in the Trinity River from Lewiston Dam to the north fork of the river (Welsh, Ashton, and Bettaso 2003).

Northwestern Pond Turtle (*Clemmys marmorata marmorata*). Federal status: None; State status: Species of Special Concern. The northwestern pond turtle occurs in a variety of riverine and wetland habitats. Pond turtles require basking sites, such as partially submerged logs, rocks, mats of floating vegetation, and open mud banks, but turtles slip from basking sites to underwater retreats at the approach of humans or potential predators. In colder areas, the turtles hibernate underwater in bottom mud (Zeiner et al. 1990c). This species is known to travel large distances upland for nesting and overwintering.

The northwestern pond turtle occurs from the Oregon border south to the American River basin in the Central Valley, where it intergrades with the southwestern pond turtle (*Clemmys marmorata pallida*). It is known to occur throughout the Trinity River Basin and is found in or near the main stem, larger tributaries, vernal pools, ponds, and lakes (Ashton, Lind, and Schlick 1997). The riverine and riparian habitat at the sites provide suitable habitat for the species.

Black Swift (*Cypseloides niger*). Federal status: None; State status: Species of Special Concern. In northern California, the black swift breeds only locally in the Sierra Nevada and Cascade Range. They nest in moist crevices or in caves on cliffs above the surf or near waterfalls. The black swift feeds exclusively on insects and forages over many habitats. Suitable nesting habitat for this species is absent from the project area; however, the species may forage over the sites during migration.

California Yellow Warbler (*Dendroica petechia*). Federal status: None; State status: Species of Special Concern. The yellow warbler is usually found in dense riparian deciduous habitats with cottonwoods, willows, alders, and other small trees and shrubs typical of open-canopy riparian woodlands. Forage patterns usually involve gleaning and hovering for insects and spiders. The yellow warbler occurs as a summer resident in northern California, however, the number of breeding pairs in the Sacramento Valley has declined dramatically in recent decades. The riparian habitat within the sites provides suitable nesting and foraging habitat for this species.

Cooper's Hawk (*Accipiter cooperii*). Federal status: None; State status: Species of Special Concern. Cooper's hawks prefer landscapes where wooded areas occur in patches and groves, which facilitate the ambush hunting tactics employed by this species. They prey upon medium-sized

birds (e.g., jays, doves, and quail) and occasionally take small mammals and reptiles. Breeding pairs in California prefer nest sites in dense stands of live oak woodland or riparian areas, and prey heavily on young birds during the nesting season. Cooper's hawks are breeding residents throughout most of the wooded areas in California, but populations have declined in recent decades. Suitable nesting and foraging habitat is present at the sites.

Golden Eagle (*Aquila chrysaetos*). Federal status: None; State status: Species of Special Concern, Fully Protected. Golden eagles are most common in rugged, open country bisected by canyons where there are ample nesting sites and food. Golden eagles nest on cliffs of all sizes or in the tops of large trees. The nests are very large stick nests, sometimes exceeding 10 ft across (Zeiner et al. 1990b). The species forages on rabbits and larger rodents, but may also take birds and reptiles; some also feed on carrion. The golden eagle is a rare permanent resident or migrant throughout California but is more common in the foothills surrounding the Sierra Nevada and Coast Ranges and in the southern California deserts. Suitable nesting habitat for this species is not present within the sites. However, the species may occur as a forager.

Merlin (*Falco columbarius*). Federal status: None; State status; Species of Special Concern. The merlin is a small falcon that preys mostly on birds that it catches while in flight. The species frequents open habitats at low elevations near water and stands of trees. Merlins do not breed in California. However, they do occur uncommonly throughout most of the state as a winter migrant, and may forage at the sites.

Northern Goshawk (*Accipiter gentiles*). Federal status: None; State status: Species of Special Concern. The northern goshawk is found in dense, mature conifer and deciduous forests, interspersed with openings and riparian habitat. Nests are typically constructed on north-facing slopes near water. They prey mainly on birds and small mammals. In California, northern goshawks breed in the North Coast Ranges through Sierra Nevada, Klamath, Cascade, and Warner Mountains. Suitable breeding and foraging habitat for this species occurs in the project area.

Osprey (*Pandion haliaetus*). Federal status: None; State status: Species of Special Concern. The osprey is associated with large, fish-bearing waters, primarily in ponderosa pine through mixed conifer habitats. It requires open, clear waters for foraging; it uses rivers, lakes, reservoirs, bays, estuaries, and surf zones. Large trees, snags, and dead-topped trees in open forest habitats are used for cover and nesting. The osprey breeds in northern California from the Cascade Range south to Lake Tahoe, and along the coast south to Marin County. Regular breeding sites include Shasta Lake, Eagle Lake, Lake Almanor, other inland lakes and reservoirs, and northwest river systems. Suitable nesting and foraging habitat for the osprey is present at the sites.

Ruffed Grouse (*Bonasa umbellus*). **Federal status: None; State status: Species of Special Concern.** Ruffed grouse are residents of valley foothill riparian and surrounding conifer forests at low to middle elevations in northwestern California. They use thickets of alder (*Alnus* spp.) and other deciduous tress for summer and fall cover and adjacent conifer stands for winter shelter. Nesting occurs near the base of a tree, stump, or log near a stream. Males use rotting logs as drumming platforms. Ruffed grouse favor aspen (*Populus* spp.), alder, and willow (*Salix* spp.) buds, but also eat leaves, flowers, and fruits of other plants as well as arthropods. Their range extends from extreme northern Del Norte County south to extreme southern Humboldt County, and westward to northern Trinity County and southwestern Siskiyou County (California Department of Fish and Game 2002). The project site provides suitable breeding and foraging habitat for this species.

Sharp-shinned Hawk (*Accipiter striatus*). **Federal status: None; State status: Species of Special Concern.** The sharp-shinned hawk is commonly found in dense woodland or riparian habitats bordering open areas. Sharp-shinned hawks typically pursue small birds in semi-open country, at the edges of open woodlands, in clearings, and along hedgerows, shorelines, or passerine migration corridors. Nest sites are usually near a water source and located in dense stands of even-aged trees on north-facing slopes. It is a fairly common migrant and winter resident throughout California, but is less common as a breeder. Suitable nesting and foraging habitat for the sharp-shinned hawk is present at the sites.

Vaux's Swift (*Chaetura vauxi*). **Federal status: None; State status: Species of Special Concern.** Vaux's swift is a summer resident of northern California that forages over most terrains and habitats, commonly at lower levels in forest openings, above burns, and above rivers. The species roosts in hollow trees and snags and occasionally in chimneys and buildings. Suitable nesting (e.g., Douglas-fir) and foraging habitat for this species is present at the sites.

Yellow-Breasted Chat (*Icteria virens*). **Federal status: None; State status: Species of Special Concern.** The yellow-breasted chat is an uncommon Neotropical migrant that occurs in riparian or marsh habitats throughout California. Yellow-breasted chats are found in valley foothill riparian habitat with thickets of dense willow and brushy tangles near watercourses. Foraging patterns usually involve gleaning insects, spiders, and berries from the foliage of shrubs and low trees. Nests are often in dense shrubs along streams. Yellow-breasted chats occur as summer breeding residents along the Sacramento River and its tributaries. The riparian habitat within the sites provides suitable nesting and foraging habitat for this species.

Long-eared Myotis (*Myotis thysanodes*). **Federal status: None; State status: None.** The long-eared myotis occurs in a variety of brush, woodland, and forested habitats from sea level to at least 9000 ft. It forages for a variety of arthropods in open habitats, along habitat edges, and over water. Long-eared myotis bats roost singly or in small groups in buildings, crevices, under bark, and in snags. In California, the species is widespread but avoids the Central Valley and hot deserts. Suitable roosting and foraging habitat for the long-eared myotis is present at the sites.

Pallid Bat (*Antrozous pallidus*). **Federal status: None; State listing status: Species of Special Concern.** This medium-sized bat occurs throughout much of California. It prefers foraging on terrestrial arthropods in dry open grasslands near water and rocky outcroppings or old structures. It may also occur in oak woodlands and at the edge of redwood forests along the coast. Roosting typically occurs in groups. Roosts often occur in caves and mine tunnels but buildings and trees may be used for day roosts. More open, sites such as buildings, porches, garages, highway bridges, and mines may be used for night roosts. Pallid bats are sensitive to human disturbances at roost sites. Suitable roosting and foraging habitat is present in the project area.

Ring-tailed Cat (*Bassariscus astutus*). **Federal status: None; State status: Fully Protected Species.** The ringtail is widely distributed in California, occurring in various riparian habitats and brush stands of most forest and shrub habitats. Nocturnal and primarily carnivorous, ringtails mainly eat small mammals but also feed on birds, reptiles, insects, and fruit. They forage on the ground, among rocks, and in trees, usually near water. Hollow trees and logs, cavities in rocky areas, and other recesses are used for cover. The montane riparian habitat within the sites provides suitable nesting and foraging habitat for this species.

Townsend's Western Big-eared Bat (*Corynorhinus townsendii*). **Federal status: None; State listing status: Species of Special Concern.** The Townsend's western big-eared bat is found in a variety of habitats. It captures its prey, principally small moths, while in flight as well as gleaning them from foliage. The pale Townsend's big-eared bat is a colonial species, and females aggregate in the spring at nursery sites known as maternity colonies. Although this species is usually cave-dwelling, many colonies are found in human-made structures, such as the attics of buildings or old abandoned mines. It is easily disturbed while roosting in buildings, and females are known to completely abandon their young when disturbed. The sites do not contain suitable roosting habitat for this species; however, they may forage in the project area.

Yuma Myotis (*Myotis yumanensis*). **Federal status: None; State status: None.** The Yuma myotis is found in a wide variety of habitats from sea level to 11,000 ft; however, it prefers open woodlands and forests near

water. It forages for insects over water sources and roosts in buildings, mines, caves, crevices, abandoned swallow nests, and under bridges. Yuma myotis are widespread throughout California. The sites do not contain suitable roosting habitat for this species; however, they may forage in the project area.

References

- Ashton, Don T., Amy J. Lind, and Kary E. Schlick. 1997. Western pond turtle (*Clemmys marmorata*). Natural History
- [web article]. USDA Forest Service, Pacific Southwest Research Station, Redwood Sciences Laboratory [cited July 20, 2007]. Available from http://www.krisweb.com/biblio/gen_usfs_ashtonetal_1997_turtle.pdf.
- California Department of Fish and Game. 2002. CWHR version 8.0 personal computer program: California Department of Fish and Game, California Interagency Wildlife Task Group.
- . 2003. California natural diversity database (CNDDDB): California Department of Fish and Game. Updated April 28, 2007.
- Craig, D., and P.L. Williams. 1998. Willow flycatcher (*Empidonax traillii*). In The riparian bird conservation plan: a strategy for reversing the decline of riparian-associated birds in California: California Partners in Flight.
- Thelander, C.G., and M. Crabtree. 1994. A guide to California's endangered natural resources: wildlife. Santa Cruz, California: BioSystems Books.
- Welsh, H., D. Ashton, and J. Bettaso. 2003. Pre-construction monitoring of herpetofauna at proposed restoration sites along the mainstem Trinity River: 2003 biannual report. Arcata, CA: Prepared for the Trinity River Restoration Program. USDA Forest Service, Pacific Southwest Region, Redwood Sciences Laboratory, and U.S. Department of the Interior, Fish and Wildlife Service.
- Zeiner, D. C., W. F. Laudenslayer Jr., K. E. Mayer, and M. White, eds. 1990b. California's wildlife Volume II: Birds. Sacramento, California: California Department of Fish and Game.

Zeiner, D.C., W.F. Laudenslayer Jr., K.E. Mayer, and M. White, eds. 1990c.
California's wildlife Volume I: Amphibians and reptiles.
Sacramento, California: California Department of Fish and Game.

Project Level Management Indicator Assemblages Report

Project Level Management Indicator Assemblages Report

Chapter 1 Introduction

The purpose of this project-level report is to evaluate and disclose the impacts of the Lewiston–Dark Gulch Rehabilitation Project on the habitat components of the wildlife management indicator assemblages as identified in the Shasta–Trinity National Forest Land and Resource Management Plan (LRMP) (USDA 1995). This report documents the effects of project alternatives on the habitat of selected Assemblages and/or their representatives.

Nine wildlife assemblages were selected as management indicators and are identified in the Shasta–Trinity Land and Resource Management Plan (LRMP) (USDA 1995, Pages 3-24 through 3-26), which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). Agency guidance for Forests that have plans developed under the 1982 planning rule directs Forest Service resource managers to (1) at the project scale, analyze the effects of proposed projects on the habitats of each management indicator assemblage affected by such projects, and (2) at the national forest (forest) or bioregional scale, monitor habitat trends of forest management indicator assemblages as identified by the LRMP, and monitor the populations trends for their selected representative species.

The Shasta–Trinity National Forest LRMP also established three fisheries assemblages (USDA 1995, Pages 3-11) and five fisheries management indicator species selected to represent those assemblages. Winter-run steelhead, spring run Chinook and summer steelhead were selected as management indicators for the anadromous fish assemblage, rainbow trout was selected for the coldwater inland fish assemblage and largemouth bass was selected for the inland warmwater fish assemblage.

1.a. Direction Regarding the Analysis of Project-Level Effects on Management Indicator Assemblage Habitat

Project-level effects on management indicator assemblages are analyzed and disclosed as part of environmental analysis under the National Environmental Policy Act (NEPA). This involves examining the impacts of

the proposed project alternatives on management indicator assemblage habitat by discussing how direct, indirect, and cumulative effects will change the quantity and/or quality of assemblage habitat in the analysis area.

These project-level impacts to habitat are then related to broader scale (generally national forest and bioregional) population and/or habitat trends.

The Shasta–Trinity NF LRMP allows for either population or habitat monitoring, or to **“use appropriate indicator species or habitat components to represent the assemblage”** (USDA 1995, pages 5-16). Consistent with the LRMP, population monitoring and survey data are generally not gathered for site-specific projects. For the selected management indicator assemblages, project-level effects analysis can be informed by forest-scale habitat monitoring and analysis alone. The Forest supplements this with extensive survey data at bioregional scales on the population trends of over 200 species of birds. The Shasta–Trinity NF LRMP requirements for management indicators analyzed for the Lewiston–Dark Gulch Rehabilitation Project are summarized in this report.

Therefore, adequately analyzing project effects to management indicator assemblages, including Threatened, Endangered, and Sensitive (TES) species that are adequate representatives of the assemblages, involves the following steps:

- Identifying which management indicator assemblages have habitat that would be either directly or indirectly affected by the project alternatives; these assemblages are potentially affected by the project.
- Disclosing the LRMP forest-level or bioregional-level monitoring requirements for this subset of forest management indicator assemblages.
- Analyzing project-level effects on management indicator assemblage habitats or habitat components for this subset.
- Discussing the forest scale habitat trends and/or the bioregional population trends of representative species for this subset.
- Relating project-level impacts on management indicator assemblage habitat to habitat at the forest scale and/or to population trends of representative species of the affected assemblages at the forest or bioregional scale.

1.b. Direction Regarding Monitoring of Management Indicator Assemblage Habitat or Population Trends at the Forest or Bioregional Scale

Forest or bioregional scale monitoring requirements for the Shasta–Trinity NF’s wildlife management indicator assemblages are found in the Monitoring Action Plan of the LRMP (USDA 1995, pages 5-16). The Shasta–Trinity LRMP allows the Forest to “**use appropriate indicator species or habitat components to represent the assemblage**” (USDA 1995, pages 5-16). It also proposes that the Forest “survey for occupancy, reproductive success, population stability and growth and ecological health.” For more information on the LRMP Forest level requirements, please see the Shasta–Trinity National Forest Wildlife Management Indicator Assemblage Report (USDA, 2007).

Table 1. Shasta Trinity NF Monitoring Proposals for the Selected Wildlife Management Indicator Assemblages (USDA 2006)

Management Indicator Assemblage	Habitat components for Analysis	LRMP Management Indicator Assemblage Monitoring Requirements ^a			
		Occupancy	Reproductive Success	Population Stability and Growth	Ecological Health
Late Seral	Tree stands with average dbh equal to or greater than 13” and having a crown density equal to or greater than 40% as represented in LRMP database.	Records of assemblage or species occurrence	Population trend of selected representative species or habitat trend	Population Trend Monitoring or habitat trend monitoring	Multiple factors ^b
Open and Early Seral	Meadows, openings, and tree stands with average dbh less than 13” or tree stands with average dbh between 13” and 24” with crown cover less than 40% as represented in LRMP database.	Records of assemblage or species occurrence	Population trend of selected representative species or habitat trend	Population Trend Monitoring or habitat trend monitoring	Multiple factors ^b

Management Indicator Assemblage	Habitat components for Analysis	LRMP Management Indicator Assemblage Monitoring Requirements ^a			
		Occupancy	Reproductive Success	Population Stability and Growth	Ecological Health
Multi-Habitat	Appropriate combinations of the other assemblages as represented in the LRMP database.	Records of assemblage or species occurrence	Population trend of selected representative species or habitat trend	Population Trend Monitoring or habitat trend monitoring	Multiple factors ^b
Snag and Down Log	Forest types greater than or equal to 13" dbh, and greater than or equal to a 40% crown cover, containing snags and down logs (as represented on the LRMP database).	Records of assemblage or species occurrence	Population trend of selected representative species or habitat trend	Population Trend Monitoring or habitat trend monitoring	Multiple factors ^b
Hardwood	Vegetation types containing significant proportions of hardwood trees as represented in the LRMP database.	Records of assemblage or species occurrence	Population trend of selected representative species or habitat trend	Population Trend Monitoring or habitat trend monitoring	Multiple factors ^b
Chaparral	Shrub dominated vegetation communities containing or dominated by chaparral species.	Records of assemblage or species occurrence	Population trend of selected representative species or habitat trend	Population Trend Monitoring or habitat trend monitoring	Multiple factors ^b

^aThe Shasta Trinity NF LRMP Monitoring Plan (USDA 1995 pages 5-16) proposes that we use either an "appropriate indicator species or habitat components" to represent the assemblage. (LRMP, Monitoring Action Plan, pages 5-16, USDA 1995.)

^bFor more details, please see the Shasta-Trinity National Forest Wildlife Management Indicator Assemblage Report (USDA 2006)

Habitat Components: Status and Trend

The Shasta-Trinity NF LRMP (USDA 1995) requires forest-scale monitoring of habitat status and trend for the selected management indicator

assemblages on the Shasta–Trinity NF. For management indicator assemblages with habitat potentially affected by the Lewiston–Dark Gulch Rehabilitation Project, these habitat monitoring requirements are summarized in Tables 1 and 4 of this report. Habitat status is the current amount of assemblage habitat on the Shasta–Trinity NF. Habitat trend is the direction of change in the amount of habitat between the time the LRMP was approved and the present. The methodology for assessing habitat status and trend is described in the Shasta–Trinity National Forest Wildlife Management Indicator Assemblage Report (USDA 2007).

Assemblage habitats are composed of the vegetation types (for example, mixed conifer forest) and/or structural features (for example, cliffs or lakes) and any special habitat elements (for example, snags) associated with a particular management indicator assemblage. “Habitat components” refers to those key characteristics that typify the category, such as trees of a certain average size and density for the Late Seral Assemblage, or the dominance of well-defined chaparral shrubs for the Chaparral Assemblage. These categories mutually overlap and any given acre of ground may or may not be categorized with several assemblage types.

The Forest will frequently supplement assemblage habitat analysis with an optional analysis of the habitat of selected, appropriate representatives of the management indicator assemblages. In this case, the required habitat is identified using habitat relationships data, models or current descriptions of their primary habitat. For each representative of a wildlife management indicator assemblage on the Shasta–Trinity NF, the habitat relationship models are selected either from the California Wildlife Habitat Relationship (CWHR) System (CWHR 2005) or better, more authoritative, more recent or more appropriate models or local descriptions.

The CWHR System is considered a state-of-the-art information system for California’s wildlife and provides the most widely used habitat relationship models for California’s terrestrial vertebrate species. In the case of some representatives of management indicator assemblages that are also federally threatened or endangered or Forest Service sensitive species, many have been studied in detail and additional habitat relationships information may be used to augment the CWHR system. Habitat relationships for fish and plant representatives of the management indicator assemblages are identified individually. Detailed information on the habitat relationships for these representatives on the Shasta–Trinity NF and on the CWHR System can be found in the Shasta–Trinity National Forest Wildlife Management Indicator Assemblages Report (USDA 2007).

Management indicator assemblage habitat trend is monitored using ecological and vegetation data for the Shasta–Trinity NF. These data include spatially explicit ecological and vegetation layers created from remote-sensing imagery. This data is verified using photo-imagery, on-the-

ground measurements, and tracking of vegetation-changing actions or events (for example, timber sales and wildland fires).

Appropriate Indicator Species: Population Status and Trend

Forest or Bioregional monitoring requirements for the management indicator assemblage of the Shasta–Trinity NF are identified in the Monitoring Action Plan of the LRMP (USDA 1995, pages 5-15 through 5-18). The Shasta–Trinity NF LRMP did not select species as representatives of each of the assemblages. The Monitoring Action Plan provides us the option of selecting either habitat components or appropriate species to represent the assemblage. The monitoring requirements for the management indicator assemblages with habitat potentially affected by the Lewiston–Dark Gulch Rehabilitation Project are summarized in Tables 1 and 4 of this report. All monitoring data are collected and/or compiled at the forest or bioregional scale, consistent with the LRMP and the 2005 Planning Rule that **“site specific monitoring or surveying of a proposed project or activity area is not required”** (36 CFR 219.14(f)).

Population status is the current trend of the selected representatives of the affected assemblage. Population trend is the direction of change in that population measured over time.

There is a wide range of monitoring data that can be used professionally to describe the status and trend (or change) of populations. This data ranges from describing changes in distribution based on presence-absence data to describing changes in population structure. Distribution population monitoring consists of collecting presence data for the management indicator assemblage representatives across a number of sample locations; over time, changes in the distribution of a representative species can be identified and tracked. Presence data is collected using a number of direct and indirect methods, such as surveys (population surveys), bird point counts, tracking number of hunter kills, counts of species sign (such as deer pellets), and so forth.

Population data for species that have been selected to represent the management indicator assemblages are collected and consolidated by the Shasta–Trinity NF in cooperation with State and Federal agency partners (including the California Department of Fish and Game, U.S. Geological Survey, and USDI Fish and Wildlife Service) or conservation partners (including Partners in Flight and various avian joint ventures). Population data includes presence data, which is collected using a number of direct and indirect methods, such as surveys (population surveys), bird point counts, tracking number of hunter kills, counts of species sign (such as deer pellets), and so forth. The Shasta–Trinity NF’s management indicator monitoring program for species typically hunted, fished, or trapped was designed to be

implemented in cooperation with California Department of Fish and Game (CDFG), consistent with direction in the 1982 Planning Rule to monitor forest-level population trends in cooperation with state fish and wildlife agencies to the extent practicable (36 CFR 219.19(a)(6)). To be biologically meaningful for wide-ranging species, presence data are collected and tracked not only at the forest scale, but also at larger scales, such as rangewide, state, province, or important species management unit (for example, Deer Assessment Unit or waterfowl migratory routes). Population data at various scales are important to both assess and provide meaningful context for population status and trend at the forest scale.

Chapter 2 Selection of Project level Management Indicator Assemblages

The amount of each habitat type and the assemblages were determined based on interpretation of aerial photography of the project area, and validated through on site ground-truthing of the proposed project area.

Management Indicator Assemblages for the Shasta–Trinity NF are identified in the LRMP (USDA 1995, page 3-24). The management indicator assemblages analyzed for the Lewiston–Dark Gulch Rehabilitation Project were selected from this list of assemblages identified in the LRMP, as indicated below in Table 2. Table 2 identifies the management indicator assemblages and categorizes them relative to the effect the project will have on the assemblage habitat.

Table2. Management indicator assemblages for Project-Level Analysis for the Lewiston–Dark Gulch Rehabilitation Project

Management Indicator Assemblages	Category for Project Analysis ¹
Late Seral	2
Openings and Early Seral	3
Multi-habitat	3
Snag and Down Log	1
Riparian	3
Aquatic	3
Hardwood Assemblage	2
Chaparral	1
Cliffs, Caves, Talus, and Rock Outcropping	1

Category 1: Management indicator assemblage whose habitat is not in or adjacent to the project area and would not be affected by the project.

Category 2: Management indicator assemblage whose habitat is in or adjacent to project area, but would not be either directly or indirectly affected by the project.

Category 3: Management indicator assemblage whose habitat would be either directly or indirectly affected by the project.

Category 1 Assemblages: Assemblages not found in or adjacent to the project area: MIS whose habitat is not in or adjacent to the project area and would not be affected by the project.

- Snag and Down Log
- Chaparral
- Cliffs, Caves, Talus, and Rock Outcropping

These habitat assemblages do not occur in the project area in amounts great enough to affect species that use these habitats. Species that are dependent upon and use the above habitat types will not be affected by the Lewiston–Dark Gulch Rehabilitation Project.

Category 2 Assemblages: Assemblages found in or adjacent to the project area, but not affected by the project:

- Late Seral
- Hardwood Assemblage

Assemblages identified as Category 2 above are present within the analysis area but the project does not directly or indirectly affect these assemblages. Therefore, the project will neither directly nor indirectly affect the habitat for these assemblages and will, therefore, have no impact on forest-level habitat or population trends. This assemblage will not be further discussed in this report.

Category 3 Assemblages: MIS assemblages that could be affected by the proposed project: The Shasta–Trinity National Forest LRMP chose to select “assemblages or groups of wildlife associated with vegetative communities or key habitat components ...as management indicators.” We will, therefore, focus on an analysis of habitat components.

- Openings and Early Seral Stage
- Multi-habitat
- Riparian
- Aquatic

Based on the criteria identified within the LRMP (USDA 1995), as summarized above, the assemblages selected for Project-Level Management Indicator analysis for the Lewiston–Dark Gulch

Rehabilitation Project are: openings and early seral stage forest, multi-habitat, riparian, and aquatic.

Chapter 3 LRMP Monitoring Requirements for Management Indicator Assemblages Selected for Project-Level Analysis

3.a. Management Indicator Assemblages Monitoring Requirements

The Shasta–Trinity NF LRMP (USDA 1995, pages 3-24 through 3-26) identifies nine forest wildlife management indicator assemblages. The LRMP Monitoring Action Plan on pages 5-15 through 5-18 describes forest and bioregion scale monitoring proposals for the Shasta–Trinity NF management indicator assemblages. Habitat and population monitoring results for the Shasta–Trinity NF’s management indicator assemblages are described in the Shasta–Trinity National Forest Wildlife Management Indicator Assemblage Report (USDA 2007) and are summarized below for the management indicator assemblages being analyzed for the Lewiston–Dark Gulch Rehabilitation Project.

Table 3. Shasta–Trinity NF LRMP Management Indicator Assemblages Requirements for the Selected Project-Level Assemblages for the Lewiston–Dark Gulch Rehabilitation Project (USDA 1995)

Selected Project-Level Management Indicator Assemblages	Project Level Management Indicator Assemblage Monitoring Requirements	
	Species	Habitat
Openings and Early Seral	Surveys for representative vertebrate species are conducted.	Quantity of available habitat type is assessed, and changes in abundance are tracked.
Multi-habitat	Surveys for representative vertebrate species are conducted.	Quantity of available habitat type is assessed, and changes in abundance are tracked.
Riparian	Surveys for representative vertebrate species are conducted.	Quantity of available habitat type is assessed, and changes in abundance are tracked.

Selected Project-Level Management Indicator Assemblages	Project Level Management Indicator Assemblage Monitoring Requirements	
	Species	Habitat
Aquatic	Surveys for representative vertebrate species are conducted.	Quantity of available habitat type is assessed, and changes in abundance are tracked.

^a LRMP, Monitoring Plan (USDA 1995, page 5-16).

3.b. How MIS Monitoring Requirements are Being Met

The Shasta–Trinity National Forest uses a multi-prong strategy to provide our decision makers with information regarding the ‘state’ of our Forest. The Strategy contains the following components:

1. Monitoring the changes in the habitat components defined for Forest level Assemblages.
2. Cooperating with Federal researchers to monitor the population trends of over 240 selected species on three different time scales over six geographic areas.
3. Cooperating with California Department of Fish and Game officials to monitor the populations of selected species.
4. Maintaining data on other factors such as climate, pathology occurrence, and other ecologically sensitive processes.

Monitoring of Assemblage Habitat Components

As noted above, the Shasta Trinity monitors the changes in vegetation patterns occurring on the forest over time. Vegetation disturbance in forest ecosystems occurs at various scales through relatively common events such as wildfire, windthrow, snowload and extreme weather damage, floods, landslides, insect and disease attacks and windthrow, and through uncommon events such as volcanic activity, glacial activity and climatic change (Oliver and Larson 1990). Forest growth and plant competition shift vegetation composition over time, some species out competing others in a particular growing space with particular conditions. Timber harvest, forest management and fire suppression can also profoundly affect vegetation composition and structure.

With the exception of forest management and fire suppression, each of these processes present a natural mechanism shifting overall habitat composition and distribution. Some environments and habitats such as many riparian zones are more variable and subject to continual disturbance events, other areas such as some high altitude forests such as the red fir forests, are less susceptible to large scale disturbance events and tend to be more stable over

time. Species adapt in variable ways to these patterns of habitat disturbance and utilize them in their own survival strategies.

By monitoring large-scale disturbance events on the Forest, decision makers can evaluate their stewardship opportunities and responsibilities to better inform their decisions.

Habitat Component Monitoring. Each of the nine wildlife assemblages is characterized by a suite of features that distinguish them from the others. For example, a forested stand cannot be categorized as part of the late-seral assemblage without trees of a minimum size and density. These key components allow us to identify and monitor the distribution and quantity of habitat assemblage types over time. Each of these components is a reliable indicator for the more complex entity that is the assemblage.

Table 4. Habitat components for the Wildlife Management Indicator Assemblage monitoring on the Shasta Trinity NF (USDA 2007)

Management Indicator Assemblage	Components for Analysis
Late Seral	Tree stands with average dbh equal to or greater than 13" and having a crown density equal to or greater than 40% as represented in LRMP database (size class 3N and above).
Open and Early Seral	Meadows, openings, and tree stands with average dbh less than 13" or tree stands with average dbh between 13" and 24" with crown cover less than 40% as represented in LRMP database (size class 3P and below).
Multi-Habitat	Appropriate combinations of the other assemblage types as represented in the LRMP database.
Snag and Down Log	Tree stands with average dbh equal to or greater than 13" and having a crown density equal to or greater than 40% (size class 3N and above) containing snags and down logs as represented in LRMP database.
Riparian	The presence of riparian classified vegetation components as mapped in the Forest LRMP data base.
Aquatic	Open bodies of water such as rivers, creeks, lakes, ponds, etc., as mapped on the Forest LRMP database.
Hardwood	Vegetation types containing significant proportions of hardwood trees as represented in the LRMP database.
Chaparral	Shrub dominated vegetation communities containing or dominated by chaparral species.
Cliffs, Caves, Talus and Rock Outcrops	The presence of significant rocky habitat sites on the Forest LRMP database.

^a The Shasta Trinity NF LRMP Monitoring Plan (USDA 1995 pages 5-16) proposes that we use either an “appropriate indicator species or habitat components” to represent the assemblage. (LRMP, Monitoring Action Plan, pages 5-16, USDA 1995.)

^b For more details, please see the Shasta–Trinity National Forest Wildlife Management Indicator Assemblage Report (USDA 2006b)

Table 5. Shasta Trinity NF Monitoring Proposals for the Selected Management Indicator Assemblages for the Lewiston–Dark Gulch Rehabilitation Project (USDA 2007)

Management Indicator Assemblage	LRMP Management Indicator Assemblage Monitoring Requirements ^a				Selected Project Level Assemblage Representative
	Occupancy	Reproductive Success	Population Stability and Growth	Ecological Health	
Open and Early Seral	Records of assemblage or species occurrence	Assemblage habitat trend and/or population trend of selected representatives	Assemblage habitat trend and/or population trend of selected representatives	Multiple factors ^b	Meadows, openings, and tree stands with average dbh less than 13” or tree stands with average dbh between 13” and 24” with crown cover less than 40% as represented in LRMP database.
Multi-Habitat	Records of assemblage or species occurrence	Assemblage habitat trend and/or population trend of selected representatives	Assemblage habitat trend and/or population trend of selected representatives	Multiple factors ^b	Appropriate combinations of the other assemblages as represented in the LRMP database.
Riparian	Records of assemblage or species occurrence	Assemblage habitat trend and/or population trend of selected representatives	Assemblage habitat trend and/or population trend of selected representatives	Multiple factors ^b	The presence of riparian classified vegetation components as mapped in the Forest LRMP data base.

Management Indicator Assemblage	LRMP Management Indicator Assemblage Monitoring Requirements ^a				Selected Project Level Assemblage Representative
	Occupancy	Reproductive Success	Population Stability and Growth	Ecological Health	
Aquatic	Records of assemblage or species occurrence	Assemblage habitat trend and/or population trend of selected representatives	Assemblage habitat trend and/or population trend of selected representatives	Multiple factors ^b	Open bodies of water such as rivers, creeks, lakes, ponds, etc., as mapped on the Forest LRMP database.

^a The Shasta Trinity NF LRMP Monitoring Plan (USDA 1995 pages 5-16) proposes that we use either an "appropriate indicator species or habitat components" to represent the assemblage. (LRMP, Monitoring Action Plan, pages 5-16, USDA 1995.)

^b For more details, please see the Shasta-Trinity National Forest Wildlife Management Indicator Assemblage Report (USDA 2006)

Chapter 4 Project Level Effects

The Lewiston – Dark Gulch Rehabilitation Project was designed to increase juvenile salmonid rearing habitat on the mainstem Trinity River. A detailed description of each of the Alternatives can be found in the Lewiston–Dark Gulch Rehabilitation Project Environmental Assessment.

No Action

If no action is taken the area would remain in its current condition.

Action Alternatives

Direct and Indirect Effects

The activities in the Proposed Action and Alternative 1 will change components of the Management Indicator Assemblages. For example, re-contouring of stream banks and creation of side-channels will require the removal of some riparian vegetation. However, most of the larger, well established riparian shrubs and trees will remain to contribute to stream shade and eventually provide large woody debris to the river system. Implementation of the project will not change the total acres of riparian assemblage habitat either within the project area, or at the forest level, it will simply change the structure and composition of the riparian assemblage. Similarly, the project proposes that some clearing of vegetation will occur in the upland areas adjacent to the riparian assemblage. These upland areas are

currently open and early seral habitat. Clearing of areas within open and early seral habitat would not cause a shift to another assemblage type, but would remain open and early seral post-project. Aquatic habitat, which in this project is the main stem of the Trinity River, would be altered to improve habitat quality for anadromous fish, but the quantity of aquatic assemblage habitat would be unchanged. The Multi-habitat assemblage is a composite of the other habitat assemblages present within the project area. Since there will be no change in the quantity of the various assemblages, there will likewise be no change in the multi-habitat assemblage.

Cumulative Effects

Since there would be no changes in quantity of any of the assemblages within the project area, the proposed project is not expected to contribute to any cumulative effects to Management Indicator Assemblage habitat.

Chapter 5 Proposed Impacts Related to MIS Population and Habitat at the Forest Scale

Using 2005 LRMP data for the Shasta Trinity National Forest the following acres for habitat used by the wildlife assemblages was calculated as follows.

- Chaparral – 133,736 acres
- Hardwood – 176,053
- Late Seral – 688,972
- Multi-habitat – 2,411,656
- Open and Early Seral Stage – 996,122
- Snag and Down Log – 1,415,076

Implementation of this project would not change these figures.

Conclusions Regarding MIS Analysis

Based on the above analysis, this biologist believes that the proposed project will not significantly alter the essential character or core habitat attributes of the area. Species associated with habitat in the project area are likely to continue to use the area as they have in the past and those that breed or reproduce either in the project area or adjacent to it will likely continue to breed and reproduce as they have in the past, barring confounding factors such as disease or predation that may independently affect the population trends of the associated species.

Chapter 6 References Used and Literature Cited

- Baumann, S. A. 1959. The breeding cycle of the rufous-sided towhee, *Pipilo erythrophthalmus*, in central California. *Wasmann J. Biol.* 17:161-220.
- BBS. 2005. The North American Breeding Bird Survey-BBS, Version 2005.1 – 25 March 2005. USGS, Patuxent Wildlife Research Center. <http://www.mbr-pwrcx.usgs.gov/bbs>.
- Bent, A. C. (O. L. Austin, Jr., ed.) 1968, *Kufu gustirues if Birtg /anerucab cardubaksm grosbeaks, buntings, towhees, finches, sparrows, and allies*. 3 parts. U.S. Natl. Mus. Bull. 237 1889 pp.
- Bock, C. E., 1942. Life Histories of North American Flycatchers, larks, swallows, and their allies. U. S. Natl. Mus. Bull. 179. 555pp.
- Bock, C. E., and J. F. Lynch. 1970. Breeding populations of burned and unburned conifer forests in the Sierra Nevada. *Condor* 72:182-189.
- Butts, K. W., 1931. A study of the chickadee and White-breasted Nuthatch by means of marked individuals. Part III: The White-breasted Nuthatch (*Sitta carolinensis cookei*). *Bird-Banding* 2: 59–76.
- CalPIF (California Partners in Flight). 2002. Version 1.0. The draft coniferous forest bird conservation plan: a strategy for protecting and managing coniferous forest habitats and associated birds in California (J. Robinson and J. Alexander, lead authors). Point Reyes Bird Observatory, Stinson Beach, CA.
- Carmen W. J., 1988. Behavioral ecology of the California Scrub Jay (*Aphelocoma coerulescens californica*): a non-cooperative breeder with close cooperative relatives. Ph.D. diss., Univ. of California, Berkeley.
- Cody M. L., 1997. Assembly rules in plant and animal communities. *In* *Assembly rules in ecological communities* (P. Keddy and E. Weiher, eds.). Princeton Univ. Press, Princeton, NJ.
- Dixon K. L., 1949. Behavior of the Plain Titmouse. *Condor* 51: 110–136.
- Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. *The birder's handbook*. Simon and Schuster, New York. 78pp.

- Erickson, M. M., 1938. Territory, annual cycle, and numbers in a population of wren-tits (*Chamaea fasciata*). Univ. of California Publ. Zool. 42: 247–334.
- Hertz, P. E., J. V. Remsen, Jr., and S. I. Zones. 1976. Ecological complementarity of three sympatric parids in a California oak woodland. Condor 78:307-316.
- Johnston, D. W. 1971. Niche Relationships among some deciduous forest flycatchers. Auk 88: 796-804 northeastern Oregon. J. For 75: 335-337.
- Laudenslayer, W. F., Jr. and R. P. Balda. 1976. Breeding bird use of a pinyon-juniper-ponderosa pine ecotone. Auk 93:571-586.
- Manuwal, D. A. 1970. Notes on the territoriality of Hammond's flycatchers in western Montana. Condor 72:364-365.
- Norris, R. A. 1958. Comparative Biosystematics and life history of the nuthatches. *Sitta pygmaea* and *Sitta pusilla*. Univ. Calif. Publ. Zool. 56:119 – 300.
- Owen, O.S. 1957. Observations on territorial behavior in the English sparrow. Bull. Ecol. Soc. Am. 38:101-102
- Peterjohn, B. G. and J. R. Sauer. 1994. Population trends of woodland birds from the North American Breeding Bird Survey. Wildl. Soc. Bull. 22: 155-164.
- Purcell, K. L., and Verner J., 1998. Density and reproductive success of California Towhees. Conserv. Biol. 12: 442–450.
- Raphael, M. G., K. V. Rosenberg, and B. G. Marcot. 1988. Large-scale changes in bird populations of Douglas-fir forests, Northwestern California. In J. A. Jackson ed., Bird Conservation 3. University of Wisconsin Press. Madison, WI.
- Raphael, M. G., and M. White. 1978. Avian utilization of snags in a northern California coniferous forest. U. S. Dep. Agric., For. Serv., Reg. 5. San Francisco. Prog. Rep. 18pp.
- Robbins, C. S., D. Bystrak and P. H. Geissler. 1986. The Breeding Bird Survey: Its first fifteen years, 1965-1979. USFWS Res. Pub. 157, Washington D.C.
- Root, R. B. 1969a. The behavior and reproductive success of the blue-gray gnatcatcher. Condor 71:16-31.

- Thomas J. W., ed 1979 Wildlife habitats in managed forests: The Blue Mountains of Oregon and Washington. U.S. Dept. Agric., For. Serv., Portland., OR. Agric. Handb. No. Avifauna No. 27. 608pp.
- U.S.D.A. Forest Service. 1994. Final Environment Impact Statement Shasta-Trinity National Forests. Redding, California
- U.S.D.A. Forest Service. 1995. Shasta-Trinity National Forests Land and Resource Management Plan. Redding, California
- U.S.D.A. Forest Service. 2007. Shasta-Trinity National Forest Wildlife Management Indicator Assemblage Report. Redding, California
- VanVelzen, W. T., ed. 1974. Thirty-eighth breeding bird census. Am. Birds 28:987-1054.2.
- Verbeek, N.A.M. 1973. The exploitation system of the yellow-billed magpie. Univ. Calif. Publ. Zool. 99:1-58.
- Yeaton R. I, 1974. An ecological analysis of chaparral and pine forest bird communities on Santa Cruz Island and mainland California. Ecology 55: 959-973

Visual Assessment Unit and Key Observation Point Photographs



Photo 1a, VAU L1, KOP 1.

View looking downstream from turnout on Hatchery Road near Trinity Hatchery entrance.



Photo 1b, VAU L1, KOP 2.

View looking upstream from turnout on Hatchery Road near Trinity Hatchery entrance.



Photo 2a, VAU L1, KOP 3.

View looking downstream from turnout on Hatchery Road downstream of previous (photos 1a and 1b), but upstream of the Sven Olberston Watchable Wildlife and Picnic area.



Photo 2b, VAU L1, KOP 4.

View looking upstream from turnout on Hatchery Road downstream of previous (photos 1a and 1b), but upstream of the Sven Olberston Watchable Wildlife and Picnic Area.



Photo 3, VAU L1, KOP 5.

View looking perpendicular to the river from Mary Smith Campground boat launch (right bank of Trinity River).



Photo 4a, VAU L2, KOP 1.

View looking downstream from Sven Olbertson Watchable Wildlife and Picnic Area.



Photo 4b, VAU L2, KOP 2.

View looking upstream from Sven Olbertson Watchable Wildlife and Picnic Area.



Photo 5a, VAU L2, KOP 3.

Trinity Dam Boulevard, north of Lewiston Bridge; view looking downstream.



Photo 5b, VAU L2, KOP 4.

Trinity Dam Boulevard, north of Lewiston Bridge; view looking upstream.



Photo 6a, VAU L2, KOP 5.

Pullout on Trinity Dam Boulevard, north of previous (photos 5a and 5b); view looking downstream.



Photo 6b, VAU L2, KOP 6.

Pullout on Trinity Dam Boulevard, north of previous (photos 5a and 5b); view looking upstream.



Photo 7a, VAU L3, KOP 1.

Pullout on Hatchery Road between Lewiston Bridge and the Old Lewiston Weir. View looking downstream.



Photo 7b, VAU L3, KOP 2.

Pullout on Hatchery Road between Lewiston Bridge and the Old Lewiston Weir. View looking upstream.



Photo 8a, VAU L3, KOP 3.

Old Lewiston Weir and Gage parking area; view looking downstream.



Photo 8b, VAU L3, KOP 4.

Old Lewiston Weir and Gage parking area; view looking upstream.



Photo 8c, VAU L3, KOP 5.

Old Lewiston Weir and Gage parking area; view looking across parking area toward Lewiston Bridge.



Photo 9, VAU L3, KOP 6.

View of Old Lewiston Weir and Gage parking area from northbound Trinity Dam Boulevard near the Rush Creek Road/Trinity Dam Boulevard intersection.



Photo 10a, VAU L4, KOP 1.

View from Lewiston Bridge looking downstream.



Photo 10b, VAU L4, KOP 2.

View from Lewiston Bridge looking upstream.



Photo 11a, VAU L4, KOP 3.

Flat southwest of the Lewiston Bridge, near the Deadwood pump house; view looking downstream.



Photo 11b, VAU L4, KOP 4.
Flat southwest of the Lewiston Bridge, near the
Deadwood pump house; view looking upstream.



Photo 12a, VAU L4, KOP 5.
View looking downstream from Rush Creek Road across
Trinity River from River Oaks Resort.



Photo 12b, VAU L4, KOP 6.
View looking upstream from Rush Creek Road across
Trinity River from River Oaks Resort.



Photo 13, VAU L4, KOP 7.
View looking perpendicular to Trinity River from
Deadwood Road east of River Oaks Resort.



Photo 14a, VAU L4, KOP 8.
River Oaks Resort river access; view looking perpendicular to river.



Photo 14b, VAU L4, KOP 9.
River Oaks Resort river access; view looking upstream.



Photo 15a, VAU L4, KOP 10.
View looking downstream from backyard of home immediately downstream of the previous (photos 14a and 14b).



Photo 15b, VAU L4, KOP 11.
View looking upstream from backyard of home immediately downstream of the previous (photos 14a and 14b).



Photo 16a, VAU L5, KOP 1.
View looking downstream from Lewiston Cableway
Trinity River access.



Photo 16b, VAU L5 KOP 2.
View looking upstream from Lewiston Cableway Trinity
River access.



Photo 17, VAU L5, KOP 3.
View perpendicular to the Trinity River from Deadwood
Road, between the Lewiston Cableway road entrance
and the Lewiston Hotel.



Photo 18a, VAU L5, KOP 4.
View looking downstream from Old Lewiston Bridge.



Photo 18b, VAU L5, KOP 5.
View looking upstream from Old Lewiston Bridge.



Photo 19a, VAU L5, KOP 6.
View looking upstream toward Old Lewiston Bridge from parking area at southwest corner of bridge.



Photo 19b, VAU L5, KOP 7.
View looking upstream toward Old Lewiston Bridge from parking area at southwest corner of bridge.



Photo 20, VAU L5, KOP 8.
View looking upstream from the Moose Lodge river access; northeast side of Old Lewiston Bridge.



Photo 21, VAU L5, KOP 9.

View looking downstream of Old Lewiston Bridge River Access at northwest corner of Lewiston Bridge.



Photo 22a, VAU L6, KOP 1.

Upstream view of Trinity River from west end of Lewiston project area, right bank of river.



Photo 22b, VAU L6, KOP 2.

Downstream view of Trinity River from west end of Lewiston project area, right bank of river.



Photo 23a, VAU L6, KOP 3.

Perpendicular view of Trinity River from home on hilltop overlooking river and historic Lewiston.





Photo 23b, VAU L6, KOP 4.

View looking northeast toward Trinity River from home on hilltop overlooking river and historic Lewiston.



Photo 24a, VAU L7, KOP 1.

View looking perpendicular to river from the Old Sawmill site on Cemetery Road.



Photo 24b, VAU L7, KOP 2.

View looking downstream from the Old Sawmill site on Cemetery Road.



Photo 25, VAU L7, KOP 3.

View of Old Sawmill site looking northeast.



Photo 26, VAU L7, KOP 4.
Cemetery Road looking south from Fish and Game
compound driveway.



Photo 1a, VAU DGOther, KOP 1.

View looking south from home adjacent to Dark Gulch, River Right.



Photo 1b, VAU DGOther, KOP 2.

View looking southeast from adjacent to Dark Gulch, River Right.



Photo 2a, VAU DG2, KOP 1.

View looking downstream from right bank Trinity River, downstream of Ward property dredge tailings.



Photo 2b, VAU DG2, KOP 2.

View looking upstream from right bank Trinity River, downstream of Ward property dredge tailings.



Photo 3a, VAU DG2, KOP 3.

View looking downstream near Ward property dredge tailings.



Photo 3b, VAU DG2, KOP 4.

View looking northwest from river.



Photo 3c, VAU DG2, KOP 5.

View looking northeast from river.



Photo 4, VAU DG2, KOP 4.

View to east of tailings piles on the Ward property.



Photo 5a, VAU DG2, KOP 7.
View looking east from river bank.



Photo 5b, VAU DG2, KOP 8.
View looking downstream from river bank.



Photo 6a, VAU DG2, KOP 9.
View looking northeast toward ponds and dredge tailings on the Ward property.



Photo 6b, VAU DG2, KOP 10.
View looking east toward ponds and dredge tailings on the Ward property.



Photo 7a, VAU DG3, KOP 1.

View of river perpendicular from berm, north of Frog Pond, east of the Bucktail Hole River Access.



Photo 7b, VAU DG3, KOP 2.

View of uplands south of berm, north of Frog Pond, east of the Bucktail Hole River Access.



Photo 7c, VAU DG3, KOP 3.

View of river looking downstream from berm, north of Frog Pond, east of the Bucktail Hole River Access.



Photo 8a, VAU DG3, KOP 4.

View of open area east of the Bucktail Hole River Access looking northeast toward Trinity River.



Photo 8b, VAU DG3, KOP 5.
View of open area east of the Bucktail Hole River
Access looking west toward Trinity River.



Photo 8c, VAU DG3, KOP 6.
View of open area east of the Bucktail Hole River Access
looking north toward Trinity River.



Photo 9, VAU DG3, KOP 7.
View of Bucktail Hole River Access parking area.



Photo 10a, VAU DG3, KOP 8.
View looking downstream from point upstream of Bucktail
Hole boat launch.



Photo 10b, VAU DG3, KOP 9.
View looking downstream from point upstream of Bucktail Hole boat launch.



Photo 11, VAU DG3, KOP 11.
View looking upstream from Bucktail Bridge.



Photo 12, VAU DG3, KOP 11.
Upstream view from access at Bucktail Bridge, right bank of river.



Photo 13a, VAU DG3, KOP 12.
Upstream view from access at Bucktail Bridge. View from gravel bar east of homes on right bank of river.



Photo 13b, VAU DG3, KOP 13.

Downstream view from access at Bucktail Bridge. View from gravel bar east of homes on right bank of river.



Photo 14, VAU DG3, KOP 14.

View of Trinity River from backyard of home on right bank of river between the Bucktail Hole boat launch and Bucktail Bridge.



Photo 15a, VAU DG3 KOP 15.

Downstream view of river from Ward property access road.



Photo 15b, VAU LDG3, KOP 16.

View looking perpendicular to river from Ward property access road.





Photo 15c, VAU DG3, KOP 17.

Upstream view of river from Ward property access road.